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The Genus *Psidium* (Myrtaceae) in Bolivia and Paraguay

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CANOTIA

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Canotia is named for *Canotia holacantha* Torr. (Celastraceae), a spiny shrub or small tree nearly endemic to Arizona.

Cover photograph: *Psidium guajava* L., cultivated by the author in Tempe, Arizona.

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INDEX TO FAMILIES OF THE VASCULAR PLANTS OF ARIZONA

Published treatments (**in bold**) can be found in volumes 26, 27, 29, 30, 32, 33, and 35 of the *Journal of the Arizona-Nevada Academy of Science* (JANAS) or in subsequent volumes (1–15) of **CANOTIA**. Unbolded entries indicate families with no treatments published to date. Figure numbers refer to illustrations in the “Key to Families of Vascular Plants in Arizona” in JANAS 35(2). All Vascular Plants of Arizona treatments are available as pdf files online at (http://www.canotia.org/vpa_project.html).

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The Genus *Psidium* (Myrtaceae) in Bolivia and Paraguay

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Abstract: The genus *Psidium* in Bolivia and Paraguay is revised and a key to the species is provided. Each of the 18 recognized species is described, illustrated, and a map of known occurrences in Bolivia and Paraguay is provided and representative specimens are cited. Specimens from adjacent countries are sometimes included in the maps and representative specimens. For each species distinguishing features, phenology, habitat, and distribution are discussed. No new taxa or combinations are proposed, and no lectotypes are chosen. *Psidium paranense* O. Berg (= *P. kennedyanum* Morong) is rejected as a later homonym of *P. paraense* O. Berg. Numerous names attributed to Barbosa Robdrigues by Chodat and Hassler are treated as *nomina nuda*. For each species a list of synonyms is provided with the citation of publications and type specimens. In the introduction, relationships with other genera, geography, and distinguishing features of *Psidium* are discussed.

Resumo: Se revisa el género *Psidium* en Bolivia y Paraguay y se proporciona una clave a las especies. Cada una de las 18 especies reconocidas se describe, se ilustra y se proporciona un mapa de ocurrencias conocidas en Bolivia y Paraguay y se citan especímenes representativos. A veces se incluyen en los mapas especímenes de países adyacentes y especímenes representativos. Para cada especie, se discuten las características distintivas, la fenología, el hábitat y la distribución. No se proponen nuevos taxones o combinaciones, y no se eligen lectotipos. *Psidium paranense* O. Berg (= *P. kennedyanum* Morong) se rechaza como un homónimo posterior de *P. paraense* O. Berg. Numerosos nombres atribuidos a Barbosa Robdrigues por Chodat y Hassler se tratan como *nomina nuda*. Para cada especie se proporciona una lista de sinónimos con la cita de publicaciones y especímenes tipo. En la introducción, se analizan las relaciones con otros géneros, la geografía y las características distintivas de *Psidium*.

INTRODUCTION

This is the second in a series of regional taxonomic treatments of *Psidium* L. (Myrtaceae). The first was a revision of the genus in Bahia, Brazil (Landrum 2017; available online at <https://canotia.org/volume13.php>) and included introductory information that will mainly not be repeated here. The reader is referred to that paper for more information on taxonomically important characteristics, geography, cytological studies, phytochemistry, and medicinal uses. A third paper (Parra-O. & Landrum, in review) treats the genus *Psidium* in Colombia.

Psidium is a genus of at least 60 species and perhaps as many as 100 (McVaugh 1968; Govaerts et al. 2008), ranging from Mexico and the Caribbean to Argentina and Uruguay. A few species have been introduced as cultivated plants in the Old World and Pacific Island tropics and subtropics, and some are weedy invasives (Global Invasive Species Database 2017). *Psidium* is one of about 50 genera in the tribe Myrteae (Lucas et al. 2007), which includes all the native American genera and species except *Metrosideros stipularis* (Hook. & Arn.) Hook. f. (= *Tepualia stipularis* [Hook. & Arn.] Griseb.) of southern South America. The distinguishing characters of *Psidium* are discussed in Landrum (2003) and in Landrum and Sharp (1989) and are: flowers (4–)5(–6)-merous (occasional flowers rarely with more petals), with multiovulate locules; placenta often peltate; seed coat hard, difficult to break or cut, the surface rough or dull, covered with a pulpy layer when wet (rarely lustrous, perhaps only when immature); hard portion of seed coat (5–)8–30 cells thick at the narrowest point, with the cells

thick-walled, elongate, and overlapping; and the embryo contained in a C-shaped cavity and thus C-shaped also, with the cotyledons much shorter than the hypocotyl.

Based on small samples of two to five species (Lucas et al. 2007; Rivero et al. 2012; Murillo et al. 2013; Vasconcelos et al. 2017; Nadra et al. 2018) and a larger study of 33 species (Proença et al. 2022), recent molecular studies of Myrtaceae indicate that *Psidium* is a monophyletic group and place it in clades with such genera as *Acca* O. Berg, *Amomyrtus* (Burret) Legrand and Kausel, *Campomanesia* Ruiz & Pav., *Legrandia* Kausel, *Mosiera* Small, *Myrrhinium* Schott, and *Pimenta* Lindl. These are all members of the morphologically based subtribe Myrtinae *sensu lato* (i.e., those genera with embryos with relatively small cotyledons and a large hypocotyl) that appears to be a basal, paraphyletic group in the tribe Myrteae.

Lucas et al. (2019) reject the paraphyletic subtribe Myrtinae and have divided the group into six subtribes, considered by them to be monophyletic, based primarily on molecular data. In their classification *Psidium* belongs to the subtribe Pimentinae, along with *Acca*, *Campomanesia*, *Curitiba* Salywon & Landrum, *Legrandia*, *Mosiera*, *Myrrhinium*, and *Pimenta*. Larger samples will be needed to place *Psidium* phylogenetically among its closest relatives.

In the field or herbarium, *Psidium* in our area can be recognized by a combination of: 5-merous flowers; calyx frequently closed in bud; inflorescence uniflorous or a dichasium; seeds often numerous, 2–10 mm long, the seed coat hard, not lustrous, operculate; largest leaves frequently 5–10 cm long. *Psidium* is compared to the several genera of Myrtaceae of Brazil in the illustrated synoptic treatment of Landrum and Kawasaki (1997). The genera of Bolivia (Holst et al. 2014) and Paraguay are nearly a subset of those of Brazil.

Proença et al. (2022) have done a representative molecular study of *Psidium*, confirming its apparent monophyly, and subdivided it into four sections and two subsections (sect. *Psidium* with subsect. *Psidium* and subsect. *Albotomentosa* (O. Berg) Tuler & Proença; sect. *Obversifolia* O. Berg; sect. *Apertiflora* O. Berg; and sect. *Mitrantes* (O. Berg) Tuler & Proença. The authors of this study offer much general information about *Psidium* morphology anatomy, ecology, and cytogenetics based on their own work and an extensive review of previous work.

I have proposed subdivisions (complexes) based on morphology for many of the species of *Psidium* (Landrum 2003, 2005, 2021b) that the reader may want to consult. The molecular phylogeny of *Psidium* of Proença et al. (2022) shows some agreement as well as disagreement with these complexes. For instance, the *P. salutare* complex (Landrum 2003) resides within the sect. *Apertiflora* (Proença et al. 2022); the *P. grandifolium* complex (Landrum 2005) corresponds closely to subsect. *Albotomentosa* (Proença et al. 2022); the *P. acidum* complex (Landrum 2021) is represented by two species (*P. acidum* and *P. friedrichsthalianum*) in the study of Proença et al. (2022; fig. 2) where they appear as sister species. One notable disagreement between our studies is that *P. guineense* and *P. guajava*, both of which I have proposed as members of the *P. guajava* complex (Landrum 2021), and both of which belong to sect. *Psidium*, do not appear together in the same subsection *Psidium*. Molecular phylogenetic studies of *Psidium* and its relatives are just beginning, and we can look forward to many more interesting results.

In his Mirtacées du Paraguay, Barbosa Rodrigues (1903) validly published several species of Myrtaceae including eight species of *Psidium*. Four years later, Chodat and Hassler (1907) published numerous names of Myrtaceae, attributing them to Barbosa Rodrigues and stating that they would be the subject of a future publication by Barbosa Rodrigues. These names have appeared in indexes such as Index Kewensis and some publications (e.g., Landrum 1986)

with the authorship cited as Barbosa Rodrigues or Barbosa Rodrigues ex Chodat & Hassler. They were published as a list with minimal, repetitive descriptions and in the opinion of Perret (1999) were not validly published and should be considered *nomina nuda*. In consultation with colleagues, I have come to accept this opinion, but in previous publications I have cited them as valid synonyms. Although the descriptions are not acceptable by modern standards and perhaps were never meant to be considered as true descriptions, the specimens cited with each name indicate clearly the identity of the entities named by Barbosa Rodrigues. The specimens, in general, are very good and are often duplicated in various herbaria. Thus, it is clear to which species these names should be assigned. In my opinion there are no new taxa among the specimens of *Psidium* listed by Chodat and Hassler. I cite them here as *nomina nuda* as a reference for future workers. Bernardi (1985) was of the same opinion and cites these names in the same way.

Bernardi (1985) attempted a taxonomic study of the whole family in Paraguay. Unfortunately, he did not have the time to do a thorough study himself and he realized it would be an enormous undertaking requiring several years by a team of workers. He tried to simplify his task by avoided cryptic characters of the ovary, seed, and embryos, but that was probably and error because the distinction of some genera was not clear. He recognized 7 species of *Psidium* in Paraguay while I recognize 10. The 7 species he did recognize, I would reduce to 5, sometimes using different names. He provided a good summary of the history of taxonomic work on Paraguayan Myrtaceae (Bernardi 1985, pp. 76–78).

The citation of types in this paper is the same as outlined in my publication on *Psidium* of Bahia, Brazil (Landrum 2017). I have left out zeros in specimen numbers that do not change the numerical value of a specimen number. Thus, NY-0005678 is cited as NY-5678. But I have cited any specimens from the ASU herbarium database with the full catalog number, for example, ASU0010503. The full ASU catalog number can be used to search for specific specimens at Symbiota sites such as <https://swbiodiversity.org/seinet/index.php> and <https://cotram.org/>.

Psidium L. Species Plantarum 470. 1753. Guava, Guayaba [Greek name for *Punica*, which it resembles]. Type species. *Psidium guajava* L.

Guajava Mill., Gard. Dict. Abr. ed. 4. 28 Jan 1754. Nom. illeg. nom. superfl. based on the same type as *Psidium* L.

Cuiavus C. J. Trew, Pl. Sel. Pinx. Ehret 4: 12. 1754. Nom. illeg. nom. superfl. based on the same type as *Psidium* L.

Guaiaiva Adanson, Fam. 2: 88, 563 ('*Guiaiva*'). Jul-Aug 1763. Nom. illeg. nom. superfl. based on the same type as *Psidium* L.

Calyptrapsidium O. Berg, Linnaea 27: 347, 349. Jan 1856 ('1854'). Type species. *C. friedrichsthalianum* O. Berg [= *Psidium friedrichsthalianum* (O. Berg) Nied.].

Myrtus subg. **Corynemyrtus** Kiaerskou, Enum. Myrt. Brasil. 39: 18. 1893. Type species. *Myrtus corynantha* Kiaerskou [= *Corynemyrtus corynantha* (Kiaerskou) Mattos, = *Psidium myrtoides* O. Berg.]

Mitropsidium Burret, Notizbl. Bot. Gart. Berlin-Dahlem 15: 486. 30 Mar 1941. Type species. *M. pittieri* Burret [= *P. oligospermum* DC.].

Corynemyrtus (Kiaerskou) Mattos, Loefgrenia 10: 1. 1963.

Subgen. Myrtopsidium Kausel, Lilloa 32: 362. 1966. Type species. *Myrtus mucronata* Cambess. [= *Psidium mucronatum* (Cambess.) Burret, = *Psidium salutare* var. *mucronatum* (Cambess.) Landrum].

Trees and shrubs; *hairs* simple, unicellular. LEAVES opposite (rarely ternate or alternate), persistent, or drought deciduous, the venation brochidodromous to eucamptodromous. INFLORESCENCE axillary, uniflorous, a dichasium of usually no more than 3 flowers, or a

bracteate shoot (raceme-like). FLOWERS (4–)5(–6)-merous, occasionally with extra petals; *calyx lobes* essentially free or more commonly their bases fused together in a bowl-like tube, or in some species the calyx lobes fused together in a cap-like calyptra that encloses the closed corolla or that is open only as a terminal pore, at anthesis tearing between the lobes or irregularly or the calyptra falling as a unit; *stamens* ca. 80 to over 700, attached to the ovary summit or on the inner surface of the bowl-like calyx tube, the petals attached just distal to the stamens; *stigma* usually wider than the style, sometimes peltate; *ovary* inferior, (2–)3–5(–6)-locular; *placenta* bilamellate and often protruding in a peltate structure; *ovules* few to numerous, uniseriate, biseriate or multiseriate on each lamella. FRUITS greenish, yellowish, reddish (rarely purplish) berries, crowned by the calyx lobes, remnants of the calyx, or by a circular scar. SEEDS few to numerous, the seed coat bony, dull or rough, (5–)8–30 cells thick at narrowest point, covered with a thin layer of pulpy tissue when wet (or a glaze or crusty tissue when dry), with a C-shaped or curved cavity that opens by means of an operculum upon germination; *cells* of the hard seed coat surface elongate, overlapping, dense; *embryo* C-shaped to curved, conforming to the seed's inner cavity, oily, the cotyledons short, usually reflexed, the hypocotyl much longer than the cotyledons.

KEY TO THE SPECIES OF PSIDIUM IN BOLIVIA AND PARAGUAY

1. Lower surface of at least young leaves densely covered with hairs, the hypanthium surface at anthesis usually obscured by hairs.
 2. Calyx open in flower bud, the lobes usually evident, with tears sometimes forming between the (4–)5 lobes.
 3. Indumentum whitish.
 4. Leaves 2–5.8 cm wide, the marginal veins not present proximally and arching broadly distally; placenta hidden by ovules, not peltate. ***P. grandifolium***
 - 4' Leaves usually less than 1.5 cm wide, the marginal vein present through leaf and closely following the margin; placenta peltate, with 1 or 2 rows of ovules on each lamella. ***P. salutare* var. *sericeum***
 - 3' Indumentum reddish brown, yellowish, silvery, or gray.
 5. Leaves silvery lanate, usually less than 1.5 cm wide; apex usually sharply acute to abruptly acuminate; hairs of leaves of two lengths, short and tangled and long and nearly straight. ***P. salutare* var. *sericeum***
 - 5' Leaves yellowish to grayish short-tomentose, often over 1.5 cm wide; apex acute to rounded; hairs of leaves uniform in length, all tangled. ***P. laruoiteanum***
 - 2' Calyx closed in flower bud or open only as a terminal pore, with tearing of calyx regular into 4 or 5 nearly equal parts or irregular in 2 to 4 unequal parts as the bud opens.
 6. Lateral veins usually more than 10.
 7. Lateral veins usually 9–22 pairs; young twigs quadrangular, more or less winged; hairs of lower leaf surface appressed, whitish, yellowish, or silvery; calyx usually tearing into 2 or 3 parts; anthers 0.7–1 mm long, usually with fewer than 10 glands. ***P. guajava***
 - 7' Lateral veins 5–10(–12) pairs; young twigs more or less terete or compressed (some vigorous shoots sometimes 4-winged); hairs of lower leaf surface more or less erect, reddish brown, or appressed, whitish or grayish; calyx usually tearing into 4 or 5 parts; anthers 1–3 mm long, often with more than 10 glands. ***P. guineense***
 - 6' Lateral veins usually less than 10.
 8. Shrubs or trees of various habitats, somewhat weedy; calyx closed or nearly so in the bud; anthers elongate, 1–3 mm long, usually 2–6 times as long as wide; placenta laminar, sometimes peltate; tertiary veins often producing a ladder-like pattern; hairs of lower leaf surface often more or less erect and reddish brown, or whitish and appressed. ***P. guineense***
 - 8' Shrubs of grasslands and cerrado; calyx open or with a distinct opening in the closed bud; anthers not elongate, 0.5–1 mm long, about 1–2 times as long as wide; placenta mound-like, not laminar or peltate (occasionally parietal, at least in part); tertiary veins reticulate; hairs of

THE GENUS *PSIDIUM* (MYRTACEAE) IN BOLIVIA AND PARAGUAY

- lower leaf surface generally appressed and straight to densely tangled, usually whitish..... *P. grandifolium*
- 1' Lower leaf surface of leaves glabrous, thinly puberulent, or only sparsely covered with hairs, the hypanthium surface at anthesis visible under any hairs (except sometimes in *P. missionum*).
9. Calyx open, bowl-like in the flower bud, the lobes prominent or not.
10. Leaves lanceolate or ovate, tapering from near the base to an acute apex, often over 10 cm long; petiole 4–14 mm long; bracteoles 10–30 mm long, narrowly elliptic; 3-flowered dichasia common; petals 13–22 mm long; seeds angular; habitat riparian..... *P. densicomum*
- 10' Leaves variously shaped, often widest at or above the middle, mainly less than 10 cm long; petiole 0–4 mm long; bracteoles 1–3(–8) mm long, mainly narrowly lanceolate; 3-flowered dichasia occasional, or common in *P. suffruticosum* only; petals 5–12 mm long; seeds rounded or sublenticular (or angular in *P. striatulum*); habitat various.
11. Proximal lateral veins connecting to a marginal vein, the marginal vein present from near base to the apex; leaves mostly widest at or below the middle, mostly elliptic.
12. Calyx in closed flower bud with a sinuate margin, the lobes absent or obscure; seeds rounded, lenticular or angular.
13. Seeds angular; petals 10–12 mm long; style 10–14 mm long; habitat riparian..... *P. striatulum*
- 13' Seeds with rounded and flat surfaces, but not angular; petals 5–8 mm long; style 6–8 mm long; habitat cerrado, campo rupestre..... *P. myrsinites*
- 12' Calyx in closed flower bud with easily distinguishable lobes; seeds rounded or lenticular.
14. Marginal vein closely following the margin; lateral veins prominent; calyx lobes acute. *P. salutare*
- 14' Marginal vein arching between the laterals, not closely following the margin; lateral veins not prominent; calyx-lobes rounded..... *P. myrsinites*
- 11' Proximal lateral veins not connecting to a marginal vein, the marginal vein only present from about mid-leaf and distally; leaves mostly widest above the middle, mostly obovate to oblanceolate.
15. Lateral veins not prominent, 5–12 pairs, leaving midvein at angle of 45–60 degrees; blades drying chocolate brown; young twigs compressed to terete, sometimes with longitudinal ridges. *P. myrsinites*
- 15' Lateral veins prominent, 4–8 pairs, leaving midvein at an angle of 30–45 degrees; blades drying olive-green to reddish brown; young twigs often 4-winged, usually square in section.
16. Calyx of flower bud with lobes about triangular, 2–5 mm long, about as long as wide; leaves mainly oblanceolate, the apex usually acuminate..... *P. missionum*
- 16' Calyx of flower bud nearly closed or the lobes truncate to broadly triangular, about 2 times wider than long; leaves and leaf apices various.
17. Leaves often 3 or more times as long as wide, lustrous above, glabrous or nearly so below; peduncles usually more than 2 cm long, usually 3-flowered; seeds up to ca. 11. *P. suffruticosum*
- 17' Leaves usually less than 3 times as long as wide, usually dull above, usually covered with appressed hairs below (these minute and inconspicuous in var. *australe*); peduncles commonly all less than 2 cm long, usually 1-flowered; seeds up to ca. 50. *P. australe*
- 9' Calyx closed or with only a terminal pore, opening by irregular or regular tears or as a calyptra, the lobes usually not notable in the flower bud.
18. A clear marginal vein not evident in at least lower half of leaf; seeds rounded or flattened-lenticular.
19. Subshrub to ca. 30 cm high, glabrous or nearly so; leaves often over 3 times as long as wide, the upper surface lustrous; petiole 0–2 mm long; ovules per locule 20 to 50; fruit usually about 1 cm long; seeds up to ca. 10..... *P. suffruticosum*
- 19' Shrubs or trees usually over 1 m high, usually pubescent on young growth; leaves usually less than 3 times as long as wide, the upper surface not usually lustrous; petiole 1–12 mm long; ovules per locule 50 to over 100; fruit often over 1 cm long; seeds usually 30 or more, sometimes over 100.
20. Lateral veins usually more than 10; hairs on lower leaf surface appressed, whitish or silvery; plants commonly cultivated. *P. guajava*

- 20' Lateral veins usually less than 10; hairs on lower leaf surface lacking or if present spreading or curled and tangled, usually yellowish brown or reddish brown; plants not cultivated (except rarely *P. guineense*).
21. Leaves, twigs and flowers usually abundantly pubescent; tertiary veins usually predominantly ladder-like; calyx closed completely, or nearly closed and with 5 minute lobes at the apex; disturbed habitats (rarely cultivated)..... ***P. guineense***
- 21' Leaves, twigs and flowers glabrous or very sparsely pubescent; tertiary veins often predominantly reticulate, but ladder-like veins common; calyx nearly closed and with 5 minute lobes at the apex; habitats frequently wet. ***P. nutans***
- 18' A clear marginal vein evident from near base of leaf to apex; seeds angular or rounded.
22. Stamens attached to inner surface of the calyx tube; tears in calyx penetrating the staminal ring as the flower opens; seeds with rounded and flat surfaces; habitats various.
23. Leaves generally widest above or at the middle; seeds usually more than 15, rounded; stamens 200–400; stigma much wider than style, 1–1.5 mm wide. ***P. cattleyanum***
- 23' Leaves generally widest below or at the middle; seeds generally less than 10, with rounded and flat sides; stamens 80–220; stigma about as wide as style, less than 0.5 mm wide. ***P. oligospermum***
- 22' Stamens attached to the summit of the ovary; tears in calyx not penetrating the staminal ring as the flower opens; seeds angular or rounded; habitats usually riparian.
24. Young twigs 4-angled and slightly winged; young growth usually sparsely strigose, the hairs appressed; petals 10–20 mm long; seeds mainly 6–9 mm long.
25. Seeds angular, more or less C-shaped but often irregular in shape; anthers generally with a prominent terminal gland and a few smaller glands below; twigs terete, compressed or quadrangular, sometimes 4-winged, the wings up to ca. 1 mm wide; remnants of calyx 0.1–0.3 mm thick; fruit wall 1–3 mm thick..... ***P. acutangulum***
- 25' Seeds kidney shaped to flattened subglobose, more or less regular in shape; anthers generally with a few to several prominent glands of about equal size distributed through the connective; twigs quadrangular, often strongly 4-winged, the wings 1–2.5 mm wide; remnants of calyx usually 0.4–0.7 mm thick; fruit wall 4–13 mm thick.
26. Lateral and marginal veins prominent and easily visible, the laterals mostly 0.3–0.5 mm wide, the principal marginal veins clearly defined, mainly running 3–10 mm from the margin; peduncle 4-angled or winged; flower bud pyriform; dried leaves uniformly colored above; Amazon basin from Tefé, Brazil to east slopes of Ecuador and Peru. ***P. acidum***
- 26' Lateral and marginal veins faint, the laterals mostly 0.1–0.2 mm wide, the marginal veins often not clearly defined, mainly running 1–4 mm from the margin when visible; peduncle flattened to terete; flower bud subglobose, fusiform, or pyriform; leaves commonly with small whitish spots above; southern Mexico, Central America, Colombia, northwestern Ecuador, Amazonian Peru and Acre, Brazil.... ***P. friedrichsthalianum***
- 24' Young twigs usually terete (weakly 4-angled sometimes in *P. kennedyanum*), unwinged; young growth usually sparsely to moderately puberulent, the hairs spreading; petals 10–12 mm long; seeds mainly 4–5 mm long.
27. Leaves usually lanceolate to narrowly lanceolate, 1.5–6 times as long as wide; anthers oblong, 1.2–1.5 mm long; leaf base attenuate, rounded, or cuneate; petiole 1–7 mm long; marginal veins 1–2 mm from margin; lateral veins rarely over 8 mm apart; calyx closed or with a small obscure terminal pore, tearing in 2–3 parts that fall soon after anthesis, the parts not truncate; seeds 5–6 mm long..... ***P. kennedyanum***
- 27' Leaves elliptic, ovate, or oblong lanceolate, 1.5–3 times as long as wide; anthers attenuate, 1.5–4 mm long; leaf base rounded, subcordate or obtuse; petiole 1–3 mm long; marginal veins up to 7 mm from margin; some lateral veins often over 10 mm apart; calyx closed or with a large clear terminal pore, tearing irregularly or in 5 lobes at anthesis, the lobes usually truncate; seeds 4–5 mm long ***P. striatulum***

1. *Psidium acidum* (DC.) Landrum, Brittonia 68: 411. 2016.

Psidium acutangulum var. *acidum* DC., Prodr. 3: 233. 1828. Type. Brazil. “ad Nogueira prov. Rio-Negro,” [near present town of Tefé, in state of Amazonas, 3.35°S, 64.7°W] C. F. P. Martius s.n. (holotype, M!, = ASU photo!, = F neg. 19748!).

Britoa acida (DC.) O. Berg, Linnaea 27: 436. 1856.

Tree or shrub up to 10(–18) m high, glabrous to minutely and sparsely strigose on young growth, strongly glandular on most surfaces; *hairs* whitish, up to ca. 0.2 mm long; *young twigs* quadrangular, 4-winged, the wings mostly about 1 mm wide but sometimes broadening to 2.5 mm wide in auriculate, stipule-like flanges at nodes, the young bark reddish-brown, exfoliating as strips and flakes, the older twigs terete with the bark smooth to minutely flaky. LEAVES elliptic, oblanceolate, or lanceolate, 5.4–15 cm long, 2.7–9 cm wide, 1.6–3.2(–3.4) times as long as wide; *apex* acuminate, sometimes abruptly so; *base* rounded, obtuse or acute; *petiole* channeled, 2–10 mm long, 1–2 mm wide; *venation* brochidodromous, the midvein impressed above, prominent below, the lateral veins (5–)6–8(–9), prominent below, often impressed above, straight or curving slightly towards apex, leaving the midvein at about a 60(–75) degree angle, connecting to a generally prominent marginal vein that arches shallowly between them, the marginal vein in larger leaves mainly running 3–10 mm from the margin, a much weaker second marginal vein sometimes running near the margin, the tertiary veins dendritic, arising from adjacent larger veins, the more prominent ones alternating with the laterals; *blades* mainly subcoriaceous, drying dark reddish brown to nearly black or gray-green, somewhat darker above than below, sublustrous or dull above, the lower surface with 4–10 glands/mm². FLOWER BUDS pyriform, 10–14 mm long, the hypanthium campanulate, 3–5 mm long, the distal portion of bud subglobose, 6–10 mm long, often apiculate; *indumentum pattern of buds* with all surfaces glabrous except for the puberulent staminal ring, or the outer surface of buds, peduncle, and occasionally the calyx within strigose in part; *peduncles* 1 flowered (occasionally 3-flowered), 10–30 mm long, 1–1.5(–2) mm wide, quadrangular to 4-winged at anthesis; *bracteoles* caducous before anthesis, narrowly triangular, ca. 1 mm long, often with colleters in the axils. CALYX closed, often apiculate, tearing irregularly at anthesis in 2 or 3 parts, these up to 0.5 mm thick, usually not persisting in fruits, the tears in the calyx not cutting the staminal ring; *petals* not seen extended, probably 1.5–2 cm long, ciliate; *disk* 5–6 mm across; *stamens* 500–700, ca. 15 mm long, the anthers ca. 1.5 mm long, with 3–15 glands in the connective, of about equal size; *style* 12–16 mm long, the stigma ca. 1 mm across; *ovary* 3–5 locular, the ovules on a peltate placenta, 50–70 per locule. FRUIT globose to subglobose, up to 2–5 cm in diameter, the lateral fruit wall 4–13 mm thick; *seeds* up to 60 or more, 6–9 mm long, kidney shaped to flattened subglobose, with rounded and flat sides, more or less regular in shape. (Fig. 3).

Representative specimen examined. BOLIVIA. Beni: Prov. José Ballivián, Espiritu, zona de influencia del Río Yacuma (ca.14.135°S, 66.72°W), 200 m, 29 Mar 1988 (fr), Beck 15137 (ASU0080872).

BRAZIL. Acre: near mouth of Rio Macauhan, (–9.333, –69.000), 27 Aug 1933 (fr), Krukoff 5696 (MO, NY, US); Tarauac, Bacia do Alto Juruá, Rio Tarauacá, margem direita, Reserva Indígena Praia do Carapanã, Colocação Vista Alegre, (–8.449, –71.349), 21 Nov 1995 (fl), Silveira et al. 1063 (MO).

PERU. Madre de Dios: Manu, Cocha Cashu Biological Station, Manu National Park, (–11.870, –71.370) 400 m, 17 Aug 1983 (st), Gentry 43654 (MO).

Phenology—Six flowering specimens seen have been collected in February, June, August, October and November. Fruits have been collected in nearly all months, with 6 of the 15 fruiting specimens seen collected in February or November.

Habitat and Distribution—*Psidium acidum* is found in virgin and disturbed lowland forests near rivers on "tierra firme" and in occasionally to frequently flooded areas. Elevations range from 180–500 m, but are mostly from 200–300 m.

Distinguishing Features—Leaves glabrous or nearly so, elliptic, ovate, or lanceolate, 5.4–15 cm long, 2.7–9 cm wide, 1.6–3.2(–3.4) times as long as wide; calyx closed in bud, tearing irregularly, but the tears not cutting the staminal ring; peduncles quadrangular to 4-winged at anthesis. *Psidium acidum* has long been confused with *P. acutangulum*; the species are compared in lead 22 of the key.

I have only seen one poor specimen of *Psidium acidum* from Bolivia. The fruits and seed appear to be typical of that species and it is likely that it may be or have been cultivated in the Amazonian region of Bolivia. For more information about the species see Landrum (2016).

2. *Psidium acutangulum* DC., Prodr. 3: 233. 1828. TYPE. Brazil. “prope Ega,” [near present town of Tefé, in state of Amazonas, 3.35°S, 64.7°W] *Martius s.n.* (M-32369).

Psidium fluviatile DC. Prodr. 3: 235. 1828, illegitimate name because *Psidium guyanense* [“guianense”] Persoon is cited as a synonym. TYPE. French Guiana. “in Cayenna,” “Rich. Ex herb Thib.” Apparently from the herbarium of Thibaud de Chanvalon, but perhaps not collected by him. (HOLOTYPE: P-258451!).

Psidium acutangulum var. *crassirame* O. Berg, in Mart. Fl. bras. 14(1): 409. 1857. Illegitimate name to be replaced by the autonym *P. acutangulum* var. *acutangulum* because Berg cites *P. acutangulum* under this variety.

Psidium acutangulum var. *tenuirame* O. Berg, in Mart. Fl. bras. 14(1): 409. 1857. TYPE. Brazil. “Ega ad flumen Amazonas,” *Martius s.n.?* (HOLOTYPE: M-32370). Specimen at P annotated by Berg (*Spruce 3126*; P-258494!) is not a type.

Guajava acutangula (DC.) Kuntze, Revis. Gen. Pl. 1: 239. 1891.

Psidium persoonii McVaugh, Mem. New York Bot. Gard. 18: 255. 1969. TYPE. Brazil. Amapá, Cachoeira Camarauá, about 3 km S of mouth of Riv. Camopi, 3°10'N, 52°19'W, 3 Oct 1960, *Irwin et al.* 48615 (HOLOTYPE: MICH-1210426!; ISOTYPES: COL-3156, F-65712f, K-565489, NY-1288077!, S-R-9455, U-5186, US-117673).

?*Psidium acutangulum* var. *oblongatum* Mattos, Loefgrenia 94: 12. 1989. TYPE. Brazil. São Paulo, Instituto Agrônômico de Campinas, *Mattos 31284* (IPRN, not found).

Shrub or small tree 2.5–6(–10) m high, glabrous, or with a few minute hairs on disk and calyx within, or sparsely pubescent on young growth, sometimes densely so on vegetative buds; *hairs*, if any, minute, whitish or reddish brown; *young twigs* terete to flattened and sulcate, or quadrangular and often 4-winged, reddish-brown, the older twigs losing any wings in about 1 year, becoming gray or remaining reddish brown, remaining smooth or becoming slightly flaky. LEAVES elliptic, ovate, or lanceolate, 3.5–13 cm long, 2–5.6 cm wide, 1–3 times as long as wide, the margins entire or slightly sinuate; *apex* acute, acuminate, or obtuse, the tip often minutely mucronate; *base* cuneate, acuminate, rounded, rarely subcordate; *petiole* channeled, (0–)1–6 mm long, 0.5–2 mm wide; *venation* brochidodromous distally, eucamptodromous proximally, the midvein impressed to nearly flat above, prominent below, the lateral veins 6–13 pairs leaving the midvein at an angle of ca. 45–60 degrees, faint or prominent, impressed slightly to raised slightly above, broadly arching or nearly straight, diminishing near the margin or attaching to a well-defined marginal vein, the marginal vein arching deeply, generally approaching within 1–2 mm of the margin, the tertiary veins dendritic, arising from adjacent larger veins; *blades* submembranous to subcoriaceous, drying dark reddish brown to gray-green, somewhat darker above than below, lustrous or dull above, the lower surface with 8–30 glands/mm². FLOWER BUDS pyriform to subfusiform, 7–13 mm long, sometimes constricted between upper and lower portions, the hypanthium obconic, ellipsoid, or campanulate, 3–5 mm long, the distal portion of

bud globose to ovoid, 4–10 mm long; *indumentum pattern of buds* with all external surfaces glabrous to sparsely strigose on peduncles, bracteoles, and hypanthium, the internal surfaces glabrous to sparsely puberulent on calyx within and disk; *peduncles* 1–3 flowered, 1–5.5 cm long, 0.5–1.5 mm wide, the side branches of the dichasium ca. 1 cm long; *bracteoles* caducous before anthesis, 1–1.5 mm long, narrowly triangular to elliptic. CALYX closed, often apiculate, or nearly closed with a smooth edged terminal pore, with no lobes evident, tearing irregularly at anthesis in 2–5 persistent pieces, these 0.1–0.3 mm thick when dry, the tears usually not cutting the staminal ring; *petals* obovate to elliptic, 1–2 cm long; *disk* 4–8 mm across; *stamens* 160–580(–800), 7–15 mm long; *anthers* 0.8–1.5 mm long, usually with a large terminal gland (occasionally without) and 1–4 smaller glands below in the connective; *style* 8–15 mm long, the stigma peltate, 0.5–0.7 mm across; *ovary* (2–)3–4(–5) locular, the placenta more or less peltate; *ovules* 2–3-seriate on each placental lamella, ca. 22–65 per locule. FRUIT subglobose, 1.5–5 cm in diameter, the fruit wall 1–3 mm thick; *seeds* 18–100 or more, angular, C-shaped or irregular, 6–9(–12) mm long, the coat 0.5–2 mm thick. (Fig. 4).

Representative specimens examined. **BRAZIL. Acre:** Senador Guimard, Basin of Rio Purus, Rio Iquiri, downstream from intersection with Br-364 hwy (10.0667°S, 67.5333°W), 5 Mar 1997 (fr), *Daly et al.* 9225 (ASU0005152). **Mato Grosso:** Cáceres (16.0667°S, 57.6833°W), Aug 1911, Comissão Rondon, *Hoehne* 4368 (ASU0005083-photo, R).

BOLIVIA. Beni: Prov. Gral. Ballivián, Espíritu en la zona de influencia del Río Yacuma, ribera alta del Río Yacuma, 200 m, 16 Aug 1985 (fl), *S.G. Beck* 5672 (MO, SEL). **Pando:** Prov. Manuripi, Boca del Manu (ca. 9.87°S, 66.37°W), 97 m, 19 Jun 2006 (fl), *Altamirano et al.* 3381 (MO); Río Madre de Dios, Genechiquia (11°17'S, 66°49'W), 125 m, 5 Sep 1985 (yfr), *Nee* 31784 (ASU0005160, MO); south bank of río Abuná, 7–8 km above mouth (ca. 9.92°S, 65.47°W), 15 Jul 68 (fl), *Prance et al.* 6063 (MICH, NY, R). **Santa Cruz:** Prov. Velasco, P. N. Kempff M., arroyo Las Londras (14°24'18"S, 61°08'40"W), 150 m, 25 Jul 1996 (fl), *Arroyo* 1363 (MO, ASU0005156); Res. Ecológica El Refugio, puesto La Toleda (14°45'02"S, 61°08'37"W), 220 m, 19 Oct 1996 (fr), *Carrión et al.* 460 (ASU0005151, MO); Prov. Velasco, 1 km N de Lazaretos (ca. 17.789°S, 63.183°W), 210 m, 15 Sep 1995 (fr), *Foster et al.* 113 (ASU0005155, MO); 3 km S del campamento La Toledo, (14°43'16"S, 61°8'58"W), 210 m, 16 Sep 1995 (fr), *Foster et al.* 142 (ASU0005154, MO); Prov. Velasco, P. N. Kempff M., campamento La Torre (13°39'S, 60°46'W), 300 m, 20 May 1994 (fl), *Quevedo et al.* 2644 (ASU0005159, MO).

PERU. Madre de Dios: Tambopata, Las Piedras, (12°29'S, 69°03'W), 200 m, 15 Oct 1991 (fr), *Timaná & Jaramillo* 2596 (ASU0005146).

Phenology—Flowering from May to August; fruiting September to January.

Habitat and Distribution—Wet areas along streams and lakes or in savannas, sometimes intermittently dry. Bolivia, Brazil, Peru, Colombia, Venezuela, and the Guianas, at elevations of about 100 to 300 m.

Distinguishing Features—Leaves glabrous or nearly so, elliptic, ovate, or lanceolate, 3.5–13 cm long, 2–5.6 cm wide, 1–3 times as long as wide; calyx closed in bud, tearing irregularly, but the tears not cutting the staminal ring; young twigs slightly 4-winged; petals 10–20 mm long.

Psidium kennedyanum of the Paraná River basin is similar to *P. acutangulum* and there may be some geographic overlap in Bolivia and Mato Grosso, Brazil. In this area *P. acutangulum* has winged twigs and *P. kennedyanum* does not or the wings are quite weak. Differences are outlined in the key below.

1. Young twigs 4-angled, slightly winged; young growth usually sparsely strigose, the hairs appressed; leaves 3.5–13 cm long, 1.5–5.6 cm wide, 1–3 times as long as wide; petals 1.5–2 cm long; disk 5–8 mm across; style 1.1–3.5 cm long; seed 6–10 mm long *P. acutangulum*
- 1' Young twigs usually terete or weakly 4-angled; young growth usually sparsely to moderately puberulent, the hairs spreading; leaves 2.5–7.5 cm long, 0.8–2.4 cm wide, usually over 3 times as long as wide; petals 1–1.2 cm long; disk 4–6 mm across; style 1.2–1.3 cm long; seed ca. 5 mm long *P. kennedyanum*

Psidium acutangulum has been confused with *P. acidum* (DC.) Landrum in the past. The two species are compared in lead 22 of the key.

3. *Psidium australe* Cambess., in A. St.-Hil., Fl. Bras. Merid. 2: 283. 1833. TYPE. Brazil. “Prope vicum vulgo Capella de Sta. Maria ad fines provinciarum Rio Grande de S. Pedro do Sul et Missionum,” *Saint-Hilaire s.n.* (HOLOTYPE: P-258487!).

Guajava australis (Cambess.) Kuntze, Rev. Gen. Pl. 1: 239. 1891.

Psidium triphyllum Barb. Rodr., Myrt. Paraguay 12. 1903. TYPE. Paraguay. “Ipê-hú... Sierra de Maracayu,” *Hassler 4990* (HOLOTYPE: G-194094).

Psidium mucronatum Barb. Rodr. ex Chodat & Hassl., Bull. Herb. Boissier 7: 798. 1907, nomen nudum. CITED COLLECTION. Paraguay. “Ipê-hu Sierra de Maracayu,” *Hassler 5082* (G [4 sheets, = ASU photos], NY!, P-258433!).

?*Psidium piribebuiense* Barb. Rodr. ex Chodat & Hassl., Bull. Herb. Boissier 7: 797. 1907, nomen nudum. CITED COLLECTION. Paraguay. “Cordillera de Piribebuy,” *Hassler 6632* (G [2 sheets, = ASU photos!], MICH-1210425!, NY-1288078!, P-258395!, P-258396!, S-r-9457, W-762). [Possible hybrid *P. australe* with *P. suffruticosum*].

?*Psidium emilhasslerianum* Barb. Rodr. ex Chodat & Hassl., Bull. Herb. Boissier 7: 799. 1907, nomen nudum. CITED COLLECTIONS. Paraguay. “pr. Tacuaral,” *Hassler 1330* (G [2 sheets, = ASU photos]) and “Cordillera de Alto,” *Hassler 1258* (G [2 sheets, = ASU photos]).

Psidium submetrale McVaugh, Mem. New York Bot. Gard. 18: 261. 1969. TYPE. Venezuela. “Bólivar: Entre San Félix y Puerto Ordaz..., elev 20 m, 26–27 Jun 1964 (fl),” *Steyermark 94275* (HOLOTYPE: MICH-1210421!).

Shrub or subshrub to ca. 1(–1.5) m high, arising from a fire resistant underground stem, with most surfaces appearing glabrous but usually with minute appressed hairs on lower leaf surface (var. *australe*), or with the lower leaf surfaces densely covered with appressed hairs (var. *argenteum*), and in both varieties with pubescent inner calyx lobe surface; *hairs* whitish, appressed, to ca. 0.5 mm long; *young twigs* usually square in cross section, with four wings, reddish brown to gray-green, glabrous to moderately pubescent, glandular, with older bark becoming gray to light brown, the bark flaking off to reveal smooth reddish brown to gray bark. LEAVES obovate, oblanceolate, narrowly elliptic, or elliptic, 3.5–11 cm long, 1.3–6 cm wide, 1.6–4.1 times as long as wide, glabrous to moderately pubescent, sometimes densely pubescent below; *apex* rounded, truncate, to acute, less often with a cuspidate tip; *base* cuneate, acute, acuminate, or rounded; *petiole* shallowly channeled, 0–4 mm long, 1.2–2 mm wide; *venation* usually eucamptodromous proximally to brochidodromous distally, the midvein impressed to flat above, prominent below, the lateral veins usually 4–8, leaving the midvein at an angle of 30–45°, a clear marginal vein not present, the tertiary veins obscure or forming an irregular reticulate pattern; *blades* coriaceous to subcoriaceous, drying light to dark olive green to dark reddish brown, usually darker above than below, lustrous or dull above. FLOWER BUDS pyriform to obovoid, 5–10 mm long, the hypanthium campanulate to obconic, 2–4 mm long, the distal portion of bud subglobose, 3–6 mm long; *indumentum pattern of buds* with all parts essentially glabrous or with peduncles, bracteoles, hypanthium, calyx without, calyx distally within, and disk sparsely to moderately appressed pubescent, with petals, disc, and style glabrous or with scattered hairs; *peduncles* 1-flowered or 3-flowered, 0.1–3.7 cm long, 0.8–1.5 mm wide, the arms of the dichasia 2–13 mm long; *bracteoles* narrowly deltoid-lanceolate, 1–3 mm long, clasping the hypanthium, usually falling before anthesis. CALYX broadly open and bowl-like, with deltoid lobes along the edge of the tube or merely with a sinuate margin, the lobes before anthesis to ca. 1 mm long, to ca. 3 mm wide; *petals* obovate

to suborbicular, elliptic, oblanceolate, 7–10 mm long, glabrous; disk 5–10 mm across; *stamens* 100–300, 6–10 mm long, reflexed in bud so that anthers reach the disk; *anthers* 0.5–0.8 mm long, with 1 apical gland in the connective; *style* 5–8 mm long, the stigma somewhat peltate; *ovary* 3–4-locular, usually with a central hollow area; *ovules* 20–95 per locule, the placenta axile but not peltate, hidden by ovules, sometimes partially parietal when locules are not completely fused. FRUIT globose to subpyriform, 1.5–3 cm long; *seeds* subreniform, 3–5 mm long, rounded, 6–50. $2n=22, 44$. (Fig. 5).

Representative specimens examined. ARGENTINA. **Misiones:** Dep. Gral. Manuel Belgrano, Ruta prov. 17, Campinas de América, Cementerio, zona de campiña (ca. 26.2824°S, 53.840°W), 2 Jul 2006 (fr), *H. A. Keller* 3554 (ASU0052981, CTES); 7 km de B. de Irigoyen, camino a San Pedro, Dep. Bernardo de Irigoyen, 17 Feb 1973 (fr), *Krapovickas et al* 23378 (CTES, MO); Candelaria, 3 km S of Arroyo Yabebiry, 4 km S of San Ignacio on ruta 12 (27°15'S, 55°35'W), 11 Dec 1987 (fr), *Landrum* 5741 (ASU0005415, CTES); Cainguás, Monte Carlo, 205 m, 28 Feb 1955 (fr), *Montes* 14782 (NY); Cainguás, ruta 8, 1 km S de Campo Grande, camino a Alba Posse, 1 Aug 1987 (fr), *Vanni et al.* 973 (ASU0005199, CTES).

PARAGUAY. **Alto Paraná:** Rva. Tatí Yupí, 14 Feb 1979 (fr), *Itaipu Binacional* 161 (MO). **Amambay:** P. N. Cerro Corá (ca. 22°35'S, 56°5'W), road to Lorito, ca. 150 m, 20 Aug 1995 (st), *Landrum* 8700 (ASU0005413, FCQ). **Caazapá:** Tavaí, destacamento militar (26°10'S, 55°20'W), 30 Oct 1988 (fl), *Basualdo* 1734 (MO); Distr. San Juan Nepomuceno, Res. Nat. privada Tapyta, parcela 3 y alrededores, 2 Aug 2012 (fr), *Vera et al.* 3432 (FCQ). **Canendiyu:** circa Ype-jhu, 1 Nov 1978 (fl), *Bernardi* 18306 (NY); Ygatimí, Reserva Natural del Bosque Mbaracayú (ca. 24°10'S, 55°40'W), Ñandu Rocai, 19 Nov 1995 (fr), *Landrum* 8859 (ASU0005411, FCQ). **Itapúa:** Capt. Miranda, 4.2 km N of entrance to Hotel Tirol near CONAVI project (27°12'S, 55°45'W), ca. 210 m, 9 Nov 1995 (fl), *Landrum* 8798 (ASU, FCQ); Capt. Miranda, road to Jesús ca. 0.6 km from main highway (ca. 27°12'S, 55°45'W), ca. 185 m, 9 Nov 1995 (fl), *Landrum* 8816 (ASU0005410, FCQ). **Misiones:** 12 km W de San Ignacio, camino a Pilar, 15 Nov 1978 (fr), *Arbo et al.* 1925 (CTES, MICH, MO); San Juan Bautista, ca. 8.5 km along road to Pilar, ca. 170 m, 8 Nov 1995 (fl), *Landrum* 8789 (ASU0005173, FCQ); rt. 1 between San Ramón to San Patricio at KM A262, ca. 4 km E of rd to Ayolas (ca. 27°5'S, 56°40'W), ca. 240 m, 8 Nov 1995 (fl, fr), *Landrum* 8795 (ASU0005169, FCQ); rt. 1, km A218, E147, between Asunción and Encarnación, ca. 210 m, 10 Nov 1995 (fl), *Landrum* 8825 (ASU0005379, FCQ); Ea. La Soledad, 3 km S de Santiago (56°46'W, 27°10'S), 3–4 Feb 1988 (fr), *Schinini & Vanni* 26054 (ASU0005200, CTES). **Paraguarí:** Parque Nacional Ybycuí, Campo cerrado en NE corner of the park on Arroyo Corrientes (26°03'S, 56°50'W), 21 Dec 1988 (fl), *Zardini et al.* 8980 (MO, PY). **San Pedro:** Estancia Santa Ana, 10 Dec 1992 (fr), *Basualdo* 4862 (FCQ); Estancia San Antonio, potrero al NE de la administración, Nov 1992 (fr), *Soria* 5410 (FCQ).

Phenology—Mainly flowering in October to December; fruiting mainly from November to February.

Habitat and Distribution—Cerrado, campos, gallery forest. Found from Venezuela and the Guianas to northeastern Argentina. This is a common species of campos and cerrados of Minas Gerais, São Paulo, Paraná, and Paraguay. Found at elevations of 290–1250 m.

Distinguishing Features—Calyx bowl-like, not closed; hypanthium glabrous, thinly puberulent, or only sparsely covered with hairs; lower leaf surface of leaves usually covered with inconspicuous, minute appressed hairs (var. *australe*) or moderately to densely covered with a layer of appressed hairs (var. *argenteum*); young twigs often 4-winged; leaves often obovate to oblanceolate. *Psidium australe* may be confused with *P. grandifolium*, with which it seems to hybridize in southern Brazil. I reproduce a key here modified from Landrum (2005) that distinguishes them.

1. Flower bud just before anthesis 6–15 mm long, densely lanate, the underlying surface of hypanthium hidden, the calyx usually nearly closed; leaves whitish lanate below, generally at least some widest near the middle *P. grandifolium*
- 1' Flower bud just before anthesis 5–10 mm long, moderately covered with hairs to glabrous, the underlying surface of hypanthium visible through hairs (if present), the calyx open; leaves glabrous to densely short pubescent below, generally widest above the middle *P. australe*

I have treated *Psidium australe* (Landrum 2005) as a variable species of three varieties. I believe that only *P. australe* var. *australe* occurs in our area. *Psidium australe* var. *argenteum* occurs farther east in Brazil and I now believe that *Psidium australe* var. *suffruticosum* is best recognized as a separate species. The two are compared in lead 11 of the key.

Since my 2005 publication, Proença and Soares-Silva (Proença et al. 2011) have described *Psidium ratterianum* in this complex from the Distrito Federal of Brazil. I think it is closely related to *P. australe* but probably sufficiently different to recognize, apparently having an unusual combination of characters (amphistomatic leaves, persistent bracteoles, ascending leaves, and quite strong venation).

Costa and Forni-Martins (2006) report $n = 22$ (*Costa 496*) and $2n = 44$ (*Costa 509*) for this species using the name *Psidium cinereum* (here considered a synonym of *P. grandifolium*). C. Proença subsequently has identified both as *P. australe* according to SpeciesLink (2017).

4. *Psidium cattleyanum* Sabine, Trans. Roy. Hort. Soc. 4: 315. pl.11. 1821. TYPE. Raised in England by William Cattley from seed from China. *Illustration: Trans. Roy. Hort. Soc. 4: 315. pl. 11. 1821.* (LECTOTYPE: Illustration of Sabine, plate 11, designated by Snow & Veldcamp 2010 and again by Tuler et al. 2018).

Psidium littorale Raddi, Alc. Sp. Pero: 6. Tab. 1, fig. 2. 1821. TYPE. Brazil. Rio de Janeiro. Illustration: Alc. Sp. Pero: 6. Tab. 1, fig. 2. 1821.

Psidium obovatum DC., Prodr. 3: 236. 1828. TYPE. Brazil. “campis prov. Sancti-Pauli,” *Martius s.n.* (HOLOTYPE: M-32379 [annotated by de Candolle]).

Psidium buxifolium Nutt., N. Am. Sylva 1: 115; t. 25. 1842. TYPE. United States. “East Florida, near the river St. Johns,” *Baldwyn s.n.* (possible HOLOTYPE: PHIL-22408).

Psidium sellowianum O. Berg, in Martius, Fl. bras. 14(1): 400. 1857. (Illegitimate superfluous name because *Psidium arboreum* Vell. is cited as a synonym.) TYPE. Brazil. “Rio de Janeiro,” *Sellow s.n.* (SYNTYPE: B, lost). *Gaudichaud s.n.* (SYNTYPE: B, lost; possible ISOSYNTYPES: P-258362!, P-258363!).

Psidium variabile O. Berg, in Martius, Fl. bras. 14(1): 400. 1857. (Illegitimate superfluous name because *Psidium cattleyanum* Sabine and *P. littorale* Raddi are cited as synonyms.) TYPE. Brazil. General statement on location of types includes B, M, MEL, W, Sprengel. Localities various—Minas Gerais: “Serra d’Itacolumi, haud longe a civitate Mariana,” *St. Hilaire s.n.*, *Widgren 1194*; São Paulo: “ad rivulum Itaque prope S. Paulo, prope Sumidor,” *St. Hilaire s.n.*, *Sellow s.n.*; Santa Catarina: “in insula S. Catharinae,” *Gaudichaud 233*. Rio Grande do Sul: *Sellow s.n.*; Uruguay: *Sellow s.n.* (SYNTYPES: none found; possible ISOSYNTYPE: *Sellow s.n.* K-565483, mounted with a non-type, *Riedel 1170*).

Psidium coriaceum Mart. ex O. Berg, in Martius, Fl. bras. 14(1): 401. 1857. (Illegitimate superfluous name because *Psidium humile* Vell. is cited as a synonym.) TYPE. Brazil. “Rio de Janeiro,” *Martius s.n.* (SYNTYPE B, lost; ISOSYNTYPE: M-32371), *Mikan and Schott 1048* (SYNTYPE: B, lost; ISOSYNTYPES: K-565482, W-46102!), *Sellow s.n.* (SYNTYPE: B, lost; ISOSYNTYPES: K-170080, K-170100, P-258444!), *Raben 752* (SYNTYPE: B, lost) and “São Paulo, prope Taubaté et Aldea de Escada,” *Martius s.n.* (SYNTYPE: B, lost; ISOSYNTYPE: M-32372), *Sellow s.n.* (SYNTYPE: B, lost). All these specimens were cited by Berg under his *P. coriaceum* var. *obovatum*, which he considered to be the typical variety.

Psidium coriaceum var. *obovatum* O. Berg, in Martius, Fl. bras. 14(1): 401. 1857. Illegitimate name to be replaced by the autonym *P. coriaceum* var. *coriaceum* because Berg cites *Psidium coriaceum* under this variety.

Psidium coriaceum var. *grandifolium* O. Berg, in Martius, Fl. bras. 14(1): 402. 1857. TYPE. Brazil. “in prov. S. Pauli,” *Sellow s.n.* (HOLOTYPE: B, lost).

Psidium coriaceum var. *longipes* O. Berg, in Martius, Fl. bras. 14(1): 402. 1857. TYPE. Brazil. “in prov. S. Pauli,” *Sellow [5875]* (HOLOTYPE: B, lost; ISOTYPES: K-170099, P-258443!).

Guajava cattleyana (Sabine) Kuntze, Revis. Gen. Pl. 1: 239. 1891.

Guajava obovata (DC.) Kuntze, Revis. Gen. Pl. 1: 239. 1891.

Guajava buxifolia (Nutt.) Kuntze, Revis. Gen. Pl. 1: 240. 1891.

THE GENUS *PSIDIUM* (MYRTACEAE) IN BOLIVIA AND PARAGUAY

- Psidium cattleianum* var. *coriaceum* Kiaerskou, Enum. Myrt. bras. 28. 1893. TYPE. Brazil. “Ad São Christovão m. Aug. 1893 florentem,” *Glaziou* 6538 (LECTOTYPE: C, seen as image, designated by Landrum [2021b]); “Blumenau, Bugreback, prov. S Catharina m. Octb. c. flor. 1866,” *Schenck* 895 (SYNTYPE: C, not found); “In cacumine campiformi Serra do mar ad Santos,” *Lund* s.n. (SYNTYPE: C, seen as image).
- Psidium cattleianum* f. *lucidum* Degener, New Illustr. Fl. Hawaiian Islands [Fam. 273]. 1939. TYPE. United States. Hawaii. *Degener* 12275 (HOLOTYPE: BISH?).
- Psidium littorale* var. *longipes* (O. Berg) Fosberg, Proc. Biol. Soc. Wash. 54: 180. 1941.
- Psidium cattleianum* var. *littorale* (Raddi) Fosberg, Occas. Pap. Bernice Pauahi Bishop Mus. 23: 37. 1962.
- Psidium ubatubense* Mattos, Cienc. and Cult. 19: 332. 1967. TYPE. Brazil. “São Paulo,” *Fontella and Moura* 102 (HOLOTYPE: SP!, lost in mail, =photo specimen, ASU0074799).
- Psidium gaudichaudianum* Proença & Faria in Proença, Faria & Mazine, Phytotaxa 308 (2): 262. 2017. TYPE. Brazil. Rio de Janeiro: *Sellow* s.n. (HOLOTYPE [“neotype”]: BM-796903). Intended as a replacement name for *P. sellowianum* O. Berg.

Shrub or tree to 1–12 m high, glabrous or the young growth puberulent to strigose on some floral structures; *hairs* whitish, most less than 0.1 mm long; *young twigs* flattened, becoming subterete, light reddish brown to light gray, the older twigs remaining more or less smooth, usually gray. LEAVES obovate, oblanceolate, elliptic, 3–10.5 cm long, 1.5–6.5 cm wide, 1.5–2.6 times as long as wide; *apex* acute, acuminate, to broadly rounded; *base* acuminate to cuneate, or rarely rounded; *petiole* channeled, 2–14 mm long, 1–2 mm wide; *venation* brochidodromous, the midvein prominent below, nearly flat to shallowly impressed above, the lateral veins 6–13 pairs, leaving the midvein at an angle of 45–60°, prominent to weak, flat or impressed above, the marginal vein arching between the laterals 1–5 mm from the margin, somewhat weaker than laterals, the tertiary veins dendritic, arising near the margin and extending towards the midvein; *blades* coriaceous (rubbery when fresh), drying light or dark reddish brown to gray-green, nearly concolorous, the upper surface after drying often mottled with whitish blotches, the margin slightly revolute. FLOWER BUD subpyriform, 5–14 mm long, the hypanthium obconic to funnel-form, 2–5 mm long, the distal portion of bud subglobose, 3–10 mm long; *indumentum pattern of buds* with all surfaces glabrous or with peduncles, bracteoles, and calyx within sometimes puberulent; *peduncles* 2–8(–13) mm long, ca. 1 mm wide, uniflorous, borne in the axils of leaves, at leafless nodes, or in the axils of leafy to reduced bracts; *bracteoles* ovate, lanceolate, or oblong, 1–2.3 mm long, caducous at anthesis. CALYX fused 3–7 mm beyond the ovary summit, terminating in a sinuate edged terminal pore or in 5 broadly rounded lobes (rarely closed and falling as a calyptra above staminal ring), tearing irregularly or between the lobes at anthesis, the tears cutting through the staminal ring; *petals* suborbicular, obovate to elliptic, 3–8 mm long; *disk* within the staminal ring ca. 4–6 mm across; *stamens* 200–400, 3–8 mm long; *anthers* 0.6–1 mm long, with 1 terminal gland; *style* 4–8 mm long, the stigma 1–1.5 mm wide; *ovary* 3–5-locular, sometimes with a few hairs on inside of locules; *ovules* 10–28 per locule, uniseriate or biseriate on each lamella, the placenta peltate, at least slightly so. FRUIT red or yellow, pyriform to subglobose, 1.5–3 cm long; *seeds* 12–64, 2–6 mm long, smooth, with rounded edges. $2n$ commonly equal to 44, 66, 88 and higher. (Fig. 6).

Representative specimens examined. Known to me by a single cultivated specimen close to our area, but likely to be found naturalized in Paraguay and Bolivia. **ARGENTINA. Buenos Aires:** Jardín Botánico de la Facultad de Agronomía, *Boelcke* 4669 (MICH).

Phenology—Flowering mainly from November to February; fruiting mainly from January to April.

Habitat and Distribution—Restinga, forest, campo, disturbed areas; frequently cultivated. Apparently native to eastern coastal Brazil in Mata Atlantica and restinga but now

widely naturalized in tropical and subtropical regions worldwide. Found at elevations from near sea level to 1450 m.

Distinguishing Features—Plants nearly glabrous, the leaves rubbery coriaceous, usually obovate to oblanceolate; calyx usually with a terminal pore, tearing irregularly on opening (rarely closed and calyptrate above the staminal ring), the tears cutting into the staminal ring.

Psidium cattleyanum is a variable species with respect to leaf and fruit size, fruit color, and ploidy level. Chromosome numbers of $2n=44$ and 88 have previously been reported. Machado (2016) reports polyploidy levels as low as $2n=3x=33$ and as high as $2n=12x=132$ with little correlation to geography or fruit color, except that higher ploidy levels may be associated with more adverse habitats. Machado also reports that individuals with red fruits tend to grow at higher elevations than those with yellow fruits. The species can be an aggressive invader in some areas such as Hawaii but is also valued for its edible fruits and ornamental value.

5. *Psidium densicomum* DC., Prodr. 3: 235. 1828. TYPE. Brazil. “ad ripas flum. Solunois et ad lacum Egensem,” [near present town of Tefé, in state of Amazonas, 3.35°S , 64.7°W] *Martius s.n.* (SYNTYPES: M-0146750 [with seeds], M-0146751 [with fruits and seeds], M-146752 [annotated by de Candolle, sterile], M-146753, M-146754). Specimens incorrectly assumed to be types are M-0171037, M-0171036, M-0171038, K-000565301, MEL2396531. They seem to be a species of *Myrcia*.

Psidium ovatifolium O. Berg, in Mart. Fl. bras. 14(1): 385. 1857. TYPE. Brazil. “in vicinia urbis Santarem prov. Paraensis,” *Spruce* 826 (HOLOTYPE: M-146865!; probable ISOTYPES: G-227727!, K-565303, K-565304, W-18890013473).

Guajava densicoma (DC.) Kuntze, Revis. Gen. Pl. 1: 239. 1891.

Guajava ovatifolia (O. Berg) Kuntze, Revis. Gen. Pl. 1: 239. 1891.

Psidium ovatifolium var. *glabrum* Amshoff, Bull. Torr. Bot. Club 75(5): 538. 1948. TYPE. Guyana. “basin of Rupununi river, Karenambo, lat. about $3^{\circ}45'\text{N}$,” *A. C. Smith* 2253 (HOLOTYPE: NY! [annotated as “typus” by Amshoff]. ISOTYPES: F-76390f!, U-104059 [annotated as “isotypus” by Amshoff], WIS-827. Additional cited specimen, “F. D. (Anderson) 686 (K)” probably not intended as type.

Shrub or small tree 2–8 m high, glabrous to abundantly hirsutulous on flowers and young growth, the trunk smooth barked; *hairs* yellowish or grayish, up to ca. 0.5 mm long; *young twigs* light gray or light brown, darkening with age, smooth or longitudinally striate, remaining relatively smooth in age. LEAVES narrowly lanceolate, lanceolate, or ovate, 5–15(–19) cm long, 1.3–8 cm wide, 1.5–4 times as long as wide, the margin entire, slightly revolute; *apex* acute to acuminate; *base* acute, broadly cuneate, rounded, or subtruncate; *petiole* narrowly channeled, 4–14 mm long, 1–2 mm wide, the epidermis minutely wrinkled; *venation* eucamptodromous to brochidodromous, the midvein shallowly concave above, prominent below, the lateral veins 6–10(–12), leaving midvein at an angle of ca. 45 degrees, broadly arching towards the apex, diminishing near the margin, or sometimes connecting to form a partial marginal vein for part of the leaf, this running 1–5 mm from the margin, the tertiary veins dendritic, weak to obscure; *blades* submembranous to subcoriaceous, drying dark reddish-brown to gray-green, somewhat darker above than below. FLOWER BUDS pyriform, 8–14 mm long, the hypanthium obconic to campanulate, 4–5 mm long, the distal portion of bud subglobose to ovoid, 5–9 mm long, sometimes wider than long; *indumentum pattern of buds* with all surfaces glabrous or peduncles, dichasium branches, bracteoles, hypanthium, calyx within and without hirsutulous, and with petals, disk and style glabrous; *peduncles* uniflorous or bearing a 3-flowered dichasium, more or less fattened, moderately glandular, (0.8–)1.5–5 cm long, 0.8–1 mm wide near middle, wider at the apex, the dichasium branches

1–2.5 cm long; *bracteoles* mostly deciduous by anthesis, sometimes persisting until fruit matures, foliaceous, 10–30 mm long, 1–5 mm wide. CALYX open in bud, cup-like, tearing between the lobes at anthesis, persisting until the fruit matures, the lobes broadly rounded on the rim of the calyx cup, 0.5–1.5 mm long; *petals* obovate, glandular, 13–22 mm long; *disk* 3–4 mm across; *stamens* 150–280, 7–10 mm long; *anthers* ca. 1 mm long; *style* 9–12 mm long; *ovary* 2–3-locular; *ovules* 5–32, uniseriate on each lamella, the placenta slightly peltate. FRUIT globose, 0.8–1.5 cm in diam.; *seeds* 9–18 in fruits seen, C-shaped, angular, 4–7 mm long, the surface dull, gray-yellow. (Fig. 7).

Representative specimens examined. BOLIVIA. Pando: Abuná, rapids on Río Abuná above Fortaleza (ca. 9.78333°S, 65.5667°W), 100 m, 8 Jul 1992 (fl), *Gentry et al.* 78002 (ASU0006142, MO); S bank of Río Abuná, 7–8 km above mouth, 15 Jul 68 (fl), *Prance* 6064 (MICH, NY).

Phenology—Flowering mainly in July and August; fruiting mainly in November and December.

Habitat and Distribution—Riparian habitats, sometimes seasonally inundated (varzea). Sometimes growing with *Myrciaria dubia* (HBK) McVaugh, the commercially important “camu-camu.” Known from Bolivia, Brazil, Colombia, Guyana, Peru, and Venezuela.

Distinguishing Features—Leaves lanceolate or ovate, tapering from near the base to an acute apex, often over 10 cm long, glabrous in our area; calyx open, bowl-like in the flower bud; petiole 4–14 mm long; bracteoles 10–30 mm long, narrowly elliptic; 3-flowered dichasia common; petals 13–22 mm long; seeds angular.

6. *Psidium friedrichsthalianum* (Berg) Niedenzu in Engl. & Prantl, Nat. Pflanzenfam. 3(7): 69. 1893.

Calyptrapsidium friedrichsthalianum O. Berg, Linnaea 27: 350. 1856. TYPE. Guatemala, “ad Grenada,” *E. von Friedrichsthal* 932 (holotype, W-48024, =F neg. 31421!).

Psidium grandiflorum Ruiz & Pav., Anales Inst. Bot. Cavanilles 15: 194. 1957. TYPE Perú. ‘ad Chicoplaya’, ilustración en Anales Inst. Bot. Cavanilles 15: 237. 1957 (MA-ajb04-d-0751). Illegitimate later homonym of *Psidium grandiflorum* Aubl., Hist. Pl. Guiane 1: 483 (1775), =*Campomanesia grandiflora* (Aubl.) Sagot.

Shrub or tree to 10 m high, minutely puberulent on young growth and flowers, glabrescent with age; *hairs* whitish to reddish brown, to ca. 0.2 mm long, mainly appressed; *young twigs* quadrangular to subquadrangular with four wings, reddish brown, losing wings in about a year, the older bark remaining smooth or becoming stringy or flaky. LEAVES elliptic, elliptic-oblong, 3–15 cm long, 1.7–6 cm wide, 1.7–2.9 times as long as wide; *apex* acute or acuminate; base acuminate, cuneate, or rounded; *petiole* 4–6 mm long, ca. 1–1.5 mm thick, channeled; *venation* brochidodromous, the midvein impressed above, prominent below, the lateral veins ca. 5–10 more or less weak pairs leaving the midvein at angle of ca. 60 degrees, slightly raised above in mature leaves, alternating with weaker (sometimes scarcely visible) dendritic veins that arise from adjacent larger veins, the marginal vein broadly arching between laterals, about equaling them in prominence; *blades* subcoriaceous to coriaceous, drying dark reddish brown to dark gray-green, nearly concolorous, the upper surface after drying often mottled with whitish blotches, often slightly lustrous, the lower surface with 3–6 glands/mm². FLOWER BUD fusiform or subglobose (with the hypanthium and distal portion of bud seamlessly blending together) or subpyriform (constricted at ovary apex), 10–18 mm long, the hypanthium obconic to fusiform-campanulate, 4–6 mm long, the distal portion of bud subglobose to ovoid, 6–12 mm long, with an apiculate apex; *indumentum pattern of buds* with external surfaces subglabrous to moderately strigulose (especially on peduncle and adjacent hypanthium), the disk and calyx within strigulose or to

glabrous, the petals glabrous or ciliate, the other surfaces glabrous or with scattered appressed hairs, all surfaces glabrescent with age; *peduncles* uniflorous, 0.7–1.6(–3.3) cm long, 1–1.5 wide (–3 mm in fruit), compressed at first, subterete upon fruiting; *bracteoles* deciduous before anthesis, narrowly triangular, ca. 1 mm long. CALYX closed in bud, tearing irregularly into 2 or 3 parts at anthesis, persisting or not, glabrous within, the calyx remnants (0.2–)0.3–0.7 mm thick when dry, up to 12 mm long, the tears not cutting the staminal ring; *petals* ca. 12 mm long; *disk* 6–9 mm across, puberulent at first; stamens 320–800, 10–15 mm long; *anthers* 1–2 mm long, with 4–20 glands in the connective; *style* 10–15 mm long, the stigma 1–1.5(–2.2) mm across dry (fresh: ca. 2 mm across, green, in contrast to white style); *ovary* 4–5–locular; *ovules* about 70–80 per locule, multiseriate on each lamella, the placenta peltate, centrally attached. FRUIT globose to pyriform, 2.4–10 cm in diameter, the wall 4–10 mm thick; *seeds* 13–110, 4–8 mm long, reniform, rounded (or rarely wedge shaped). (Fig. 8).

BOLIVIA. Pando: West bank of Río Madeira, 12 km above Abunã, Brazil, (ca. -9.8, -65.4), 20 Jul 1968 (fl), *Prance et al* 6204 (INPA, MICH, NY, R, US).

BRAZIL. Acre: Mun. Plácido de Castro, Rio Xipamano, Colocação Vai-Quem-Quer, (-10.267, -67.188), 14 Jan 1995 (fr), *C. Figueiredo* 559 (ASU).

PERU. Madre de Dios: Tambopata, Dist. Puerto Maldonado, Cusco Amazonico, (-13.133, -69.600), 285m, 25 Nov 2002 (fr), *L. Valenzuela & I. Huamantupa* 1047 (ASU, MO); **Pasco:** Oxapampa, Dist. Pozuzo, Sector Palmira, Parcela del Sr. Agustín Egg, (-10.200, -75.570), 850m, 1 Jan 1970 (fl), *E. Blasido* 221(ASU); Oxapampa, comunidad nativa Nueva Aldea - Sector Santa María, (-10.374, -75.067), 355m, 20 Mar 2009 (fr), *R. Rojas* 6562 (ASU).

Phenology—Specimens indicate that flowering and fruiting can occur throughout the year. Cultivated plants in Arizona mainly bloom in the spring and to a lesser extent in the fall. I suspect that flowering is correlated with periods of rapid vegetative growth.

Habitat & Distribution—Forests, especially along streambeds; (30–)100–1000 m elev.; from southern Mexico northern Colombia and western Venezuela.

Distinguishing Features—*Psidium friedrichsthalianum* is most likely to be confused with *P. acutangulum* and *P. acidum*. The three species are compared in leads 25 and 26 of the key.

Common names and uses—El Salvador – arrayán (*Calderon* 1105, NY); Costa Rica – cas (*Skutch* 3914, MO), kas-kra (*Pittier* 12072, CR); Honduras – guayaba de mico (*Nelson et al.* 6673, MO); yunguilla—Esmeraldas, Ecuador, in Chachi language (*Cornejo* 8670, ASU). The name guayaba is also used with such modifiers as: ágria, de agua, cimarrona, de danto, de fresco, de monte, del río. The species has a wide range and is found near sea level to about 1900 m. I suspect that it has been distributed widely by indigenous people because of its edible fruits.

7. *Psidium grandifolium* DC., Prodr. 3: 234. 1828. TYPE. Brazil. “ad Ypanema prov. S. Pauli,” *Martius s.n.* (HOLOTYPE: M-32375).

Psidium cinereum DC., Prodr. 3: 234. 1828. TYPE. Brazil. “prov. Sancti Pauli,” *Martius s.n.* (HOLOTYPE: M-146757).

Psidium incanescens DC., Prodr. 3: 234. 1828. TYPE. Brazil. “prope Taubate prov. S. Pauli,” *Martius s.n.* (HOLOTYPE: M-32378; ISOTYPE: BR-528845!).

Psidium ternatifolium Cambess., in A. St.-Hil., Fl. Bras. Merid. 2: 278. 1833. TYPE. Brazil. “Fazenda das Lages in provincia S. Pauli,” *Saint-Hilaire s.n.* (HOLOTYPE: P-258455!).

Psidium grandifolium var. *genuinum* O. Berg, in Mart., Fl. bras. 14(1): 406. 1857. Illegitimate name to be replaced by the autonym *P. grandifolium* var. *grandifolium* because Berg cites *P. grandifolium* under this variety.

THE GENUS *PSIDIUM* (MYRTACEAE) IN BOLIVIA AND PARAGUAY

- Psidium grandifolium* var. *intermedium* O. Berg, in Mart., Fl. bras. 14(1): 407. 1857. TYPE. Brazil. “prov. Rio Grande do Sul,” *Sellow s.n.* (HOLOTYPE: B, lost; LECTOTYPE: P-258453! [isotype designated as lectotype by Landrum, 2005]; ISOLECTOTYPE: P-258454!).
- Psidium grandifolium* var. *ternatifolium* (Cambess.) O. Berg, in Mart., Fl. bras. 14(1): 407. 1857.
- Psidium grandifolium* var. *heterophyllum* O. Berg, in Mart., Fl. bras. 14(1): 407. 1857. TYPE. Brazil. “prov. Minarum,” *Claussen 1527* (HOLOTYPE: W-16677; ISOTYPE: LE-6980).
- Psidium grandifolium* var. *tenuinerve* O. Berg, in Mart., Fl. bras. 14(1): 407. 1857. TYPE. Brazil. “prov. Minarum prope urbem S. João,” *Pohl 3630* (HOLOTYPE: W-16681).
- Psidium cinereum* var. *angustifolium* O. Berg, in Mart., Fl. bras. 14(1): 404. 1857. Illegitimate name to be replaced by the autonym *P. cinereum* var. *cinereum* because Berg cites *P. cinereum* under this variety.
- Psidium cinereum* var. *brevipes* O. Berg, in Mart., Fl. bras. 14(1): 404. 1857. TYPE. Brazil. “in prov. Minarum,” *Claussen 527* (HOLOTYPE: BR-843772; ISOTYPES: G [= F-neg. 23492], K-565481).
- Psidium cinereum* var. *intermedium* O. Berg, in Mart., Fl. bras. 14(1): 404. 1857. TYPE. Brazil. “prope urbem Barbacena prov. Minarum,” *St. Hilaire s.n.* (SYNTYPE: B, lost) and “ad Urbem Ypanema prov. S. Pauli,” *Sellow s.n.*, (SYNTYPE: B, lost; LECTOTYPE: P-258482! [isosyntype designated lectotype by Landrum, 2005]; remaining ISOSYNTYPES, P-258480! in part, mixed sheet, K-565480 in part, mixed sheet).
- Psidium incanescens* var. *parvifolium* O. Berg, in Mart., Fl. bras. 14(1): 403. 1857. TYPE. Brazil. “v. in. herb. Sond. et Mart,” “prov. Minarum prope urbem S. João del Rey,” *St. Hilaire s.n.* (no specimens found), *Widgren 529* (ISOSYNTYPES: LE-6982, R-162761!), and “Chapeo d’Uvas,” *White 4163* (SYNTYPE: BR-843775).
- Psidium incanescens* var. *rotundifolium* O. Berg, in Mart., Fl. bras. 14(1): 403. 1857. TYPE. Brazil. “prov. Rio Grande do Sul,” *Sellow s.n.* (SYNTYPE: B, lost) and “S. Rita et S. João Baptista,” *Pohl 500* (SYNTYPE: B, lost; LECTOTYPE: W-46100!, [isosyntype designated as lectotype by Landrum, 2005]) and “ad Paracatu,” *Pohl 729* (SYNTYPE: B, lost; ISOSYNTYPE: W-48297!).
- Psidium incanescens* var. *cuneatum* O. Berg, in Mart., Fl. bras. 14(1): 403. 1857. Illegitimate name to be replaced by the autonym *P. incanescens* var. *incanescens* because Berg cites *P. incanescens* under this variety.
- Psidium cuneatum* var. *incanescens* O. Berg, in Mart., Fl. bras. 14(1): 405. 1857. TYPE. Brazil. “in eadem prov,” [i.e., Minas Gerais], *Regnell I-129* (HOLOTYPE: MEL-2101229; ISOTYPE: U-5181).
- Psidium grandifolium* var. *albidum* O. Berg, in Mart., Fl. bras. 14(1): 603. 1859. TYPE. Brazil. “Prope Pindamonhangaba et Taubate,” *Riedel [1379]*. (HOLOTYPE: LE-6979).
- Psidium grandifolium* var. *incanescens* O. Berg, in Mart., Fl. bras. 14(1): 603. 1859. TYPE. Brazil. “Prope Pindamonhangaba et Taubate,” *Riedel [1379]*. (HOLOTYPE: LE-6981).
- Psidium riedelianum* O. Berg, in Mart., Fl. bras. 14(1): 603. 1859. TYPE. Brazil. “prope villam Jaguará prov. Minarum,” *Riedel s.n.* (apparent HOLOTYPE, LE-7001).
- Guajava incanescens* (DC.) Kuntze, Rev. Gen. Pl. 1: 239. 1891.
- Guajava grandifolia* (DC.) Kuntze, Rev. Gen. Pl. 1: 239. 1891.
- Guajava cinerea* (DC.) Kuntze, Rev. Gen. Pl. 1: 239. 1891.
- Guajava riedeliana* (O. Berg) Kuntze, Rev. Gen. Pl. 1: 239. 1891.
- Psidium eriophyllum* Barb. Rodr., Myrt. Paraguay 12. 1903. TYPE. Paraguay. “vicine Rio Igatemy, prope Yerbales Serra Maracayu,” *Hassler 5659* (HOLOTYPE: G-194090 [2 sheets]).
- Psidium lanatum* Barb. Rodr., Myrt. Paraguay 13. 1903. TYPE. Paraguay. “Ipe hu.....Serra Maracayu,” *Hassler 5263* (HOLOTYPE: G-194092).
- Psidium spodophyllum* Barb. Rodr., Myrt. Paraguay 14. 1903. TYPE. Paraguay. “prope Rio Corrientes,” *Hassler 4521* (HOLOTYPE: G-194093).
- Psidium apaense* Barb. Rodr. ex Chodat & Hassl., Bull. Herb. Boissier 7: 798. 1907, nomen nudum. CITED COLLECTION. Paraguay. “in regione cursu superioris fluminis Apa,” *Hassler 8529* (G [= ASU photo]).
- Psidium paraguayense* Barb. Rodr. ex Chodat & Hassl., Bull. Herb. Boissier 7: 798. 1907, nomen nudum. CITED COLLECTION. Paraguay. “pr. Igatimi,” *Hassler 4831* (G [3 sheets, = ASU photos], BM-511330).
- Psidium psychrophyllum* Barb. Rodr. ex Chodat & Hassl., Bull. Herb. Boissier 7: 797. 1907, nomen nudum. CITED COLLECTION. Paraguay. “in alta-planitie Loma guazu in valle fluminis Y-aca,” *Hassler 6805* (G [2 sheets, = ASU photos]).
- Psidium yacaense* Barb. Rodr. ex Chodat & Hassl., Bull. Herb. Boissier 7: 797. 1907, nomen nudum. CITED COLLECTION. Paraguay. “pr. Valenzuela,” *Hassler 7099* (G [= ASU photo]).

Psidium cinereum var. *paraguariae* D. Legrand, Fl. Illustr. Catarin., Mirtáceas 694. 1977. TYPE. Paraguay. *Rosengurtt* 5407 (HOLOTYPE: MVM) and *Pedersen* 4366 (PARATYPE: MVM? ISOPARATYPES: MO!, NY! [= ASU photo], SI-3060).

Psidium cinereum DC. var. *incanescens* (DC.) D. Legrand, Fl. Illustr. Catarin., Mirtáceas, 692. 1977.

Shrub to ca. 1.5 m high, densely white tomentose or pubescent on young growth; *hairs* white (sometimes with a reddish brown tinge), up to ca. 1.5 mm long; *young twigs* often square in cross section, especially in vigorous growth, densely white tomentose. LEAVES elliptic, obovate, oblanceolate, lanceolate, (rarely suborbicular), 3.6–12 cm long, 2–5.8 cm wide, 1.7–3 times as long as wide, densely white tomentose below, sparsely hairy to glabrescent above when mature, often with somewhat longer, persistent hairs along the midvein above; *apex* acute, rounded, acuminate, often with a cuspidate tip; *base* acute, obtuse, rounded, or cuneate; *petiole* 1–6 mm long, 1–2 mm thick, channeled or not; *venation* usually eucamptodromous proximally to brochidodromous distally, the midvein impressed to flat above, prominent below, the lateral veins usually 4–7, ascending, a clear marginal vein not present, the smaller tertiary veins obscure or forming an irregular reticulate pattern, sometimes impressed above; *blades* subcoriaceous to stiffly coriaceous, dull to lustrous above, drying dark reddish brown to gray-green. FLOWER BUDS pyriform, campanulate, or subobconic, densely white tomentose, 7–15 mm long, the hypanthium obconic, 2.5–7 mm long, the distal portion of bud subglobose, 4–9 mm long; *indumentum pattern of buds* with all external surfaces except petals tomentose to pubescent, the bracteoles glabrous to tomentose within, the petals glabrous to pubescent without, glabrous within, the calyx densely covered with hairs within at least distally, the disk subglabrous to pubescent, the style glabrous; *peduncles* 0.2–5 cm long, 1–2 mm thick; *bracteoles* linear to narrowly elliptic, 2–8 mm long. CALYX nearly closed except for a terminal pore, with small lobes around the margin of the pore that are wider than long, to bowl-like with clearly distinguishable deltoid lobes that are up to 3 mm long and wide, the fused tubular portion of the calyx 1–4 mm long, tearing between the lobes or irregularly at anthesis, the tears sometimes cutting the staminal ring; *petals* elliptic to obovate, 9–10 mm long; *disk* 5–9 mm across; *stamens* (80–)260–560, 4–11 mm long; *anthers* oblong, 0.8–1 mm long, with 1–3 glands in the connective; *style* 5–10 mm long; *ovary* 2–5-locular, or sometimes the locules not completely fused; *ovules* 25–80 per locule, ca. 6-seriate, the placenta axile but not peltate, hidden by an obconic mass of ovules, sometimes partially parietal when locules are not completely fused. FRUIT subglobose, 1–2.5 cm in diameter; *seeds* (2–)3–4(–6) mm long, smooth, rounded, 19–85 per fruit, frequently attacked by insects and larger than normal. (Fig. 9).

Representative specimens examined. ARGENTINA. **Corrientes:** Dep. Ituzaingo, 7 km S of río Aguapey on Ruta 39, 27.6°S, 56.68°W, 17 Dec 1981 (fl), *Carnevali* 4947 (ASU0006708, CTES). **Misiones,** San Ignacio, new road to Loreto, ca. 1 km from Ruta 12, 27.26°S, 55.54°W, 11 Dec 1987 (fl), *L. R. Landrum* 5731 (ASU0007324, CTES); San Ignacio, ca. 3 km along road to Peña Victoria, Teyu Cuare, 27°15'S, 55°35'W, 10 Dec 1987 (fl), *Landrum* 5717 (ASU0007323, CTES).

BRAZIL. Mato Grosso do Sul: Rod. MT-624, 5 km W de Tacuru (ca. -23.623963 S, -55.020423 W), 16 Dec 1983 (fl), *Hatschbach* 47309 (ASU0007340); Rod. MS-164, Fazenda Itamarati, Mun. Ponta Porã (ca. -23.623963 -55.020423), 11 Mar 2004 (fr), *Hatschbach* 76918 (ASU0059730); camino a Colonia Estrella, 1 km W del Hito, (ca. 22.3667° S, 55.75° W), 500 m, 10 Dec 1997 (fr), *Schinini & Dematteis* 33633 (ASU0007380).

BOLIVIA. Santa Cruz: Prov. Chiquitos, 3–5 km a NE de Santiago de Chiquitos (18°20'S, 59°35'W), 22 Oct 1994 (fl), *Vargas* 3496 (ASU0007387).

PARAGUAY. Amambay: camino a Colonia Estrella, 1 km W del Hito (55°45'W, 22°22'S), 500 m, 10 Dec 1997 (fr), *Schinini & Dematteis* 33633 (ASU0007380); Colonia Pai Tavytera, camino a Lorito Picada, 23 Feb 1997 (fl), *Soria* 7867 (FCQ). **Caaguazú:** Arroyo Yuquyry-Arroyo Taruma, 4 km N of Arroyo Yuquyry (25°13'S, 55°55'W), 12 Jan 1991 (fr), *Zardini & Velázquez* 25882 (ASU0007314). **Caazapá:** Tavaí, destacamento militar (26°10'S, 55°20'W), 30 Oct 1988 (fl), *Basualdo* 1732 (ASU0007325, FCQ). **Canindeyú:** Res. Nat. Bosque

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Mbaracayú, Ypejhú y Villa Ygatimí, Ñandu Rocai, 19 Nov 2020 (fl), *Degan et al.* 4739 (FCQ); Ygatimí, Res. Natural del Bosque Mbaracayú, Ñandu Rocai (ca. 24°10'S, 55°40'W), 19 Nov 1995 (fl), *Landrum* 8855 (ASU0006717, FCQ); Res. Nat. Bosque Mbaracayú, Cerrado Aguara Ñú, campos de Valinoti cue, 23 Feb 2016 (fl), *Rolón et al.* 160 (FCQ). **Itapúa:** Trinidad, 19 Dec 1985 (fl), *Basualdo* 1010 (FCQ); Capitán Miranda, 4.2 km N of entrance to Hotel Tirol beside CONAVI project (ca. 27°12'S, 55°45'W), ca. 210 m, 13 Aug 1995 (fr), *Landrum* 8661 (ASU0007310, FCQ); road to Jesús, 0.6 km from main highway (ca. 27°12'S, 55°45'W), ca. 185 m, 9 Nov 1995 (fl), *Landrum* 8810 (ASU0007327, FCQ); San Juan Bautista, 8.5 km along road to Pilar, ca. 170 m, 8 Nov 1995 (st), *Landrum* 8792 (ASU0007334, FCQ). **Paraguari:** Salto de Pirareta, 14 Nov 1978 (fr), *Arbo et al.* 1754 (NY); route 1 near km 246, ca. 0.5 N on road to Lago Ypoa (26°S, 57°15'W), ca. 250 m, 7 Nov 1995 (fl), *Landrum* 8766 (ASU0006720, FCQ); National Park Ybycuí, Arroyo Corrientes (26°00'S, 56°46'W), 10 Feb 1993 (fr), *Zardini & Guerrero* 34974 (ASU0007332). **San Pedro:** 36 km N de Tacuara, Ea. La Manina (24°22'S, 56°24'W), 21 Oct 1994 (fl), *Krapovickas et al.* 45798 (ASU0007386, CTES); 70 km N de Tacuara (24°1'S, 56°5'W), 15 Dec 1986 (fr), *Perez et al.* 1465 (ASU0007341).

Phenology—Flowering throughout year but mainly from October to December; fruiting throughout year but mainly from November to March.

Habitat and Distribution—Northeast Argentina, Paraguay, Bolivia, and Brazil (Santa Catarina to Bahia); campo and cerrado at 800 to 1200 m.

Distinguishing Features—Hypanthium and lower surface of at least young leaves densely covered with whitish hairs, the hypanthium surface at anthesis usually obscured by hairs; *venation* usually eucamptodromous proximally to brochidodromous distally, the lateral veins usually 4–7 pairs, ascending; calyx open and bowl-like, to nearly closed.

Common names—Katuava in Paraguay.

Hybridization with *Psidium guineense* appears to be common and confusion with that species is possible. Below is a key that distinguishes *P. grandifolium* from *P. guineense*.

1. Anthers elongate, 1–3 mm long, usually 3–6 times as long as wide; placenta laminar, sometimes peltate; tertiary veins often producing a ladder-like pattern; hairs of lower leaf surface usually more or less erect, mostly nearly straight, usually reddish brown. *P. guineense*
- 1' Anthers not elongate, 0.5–1 mm long, about 2 times as long as wide; placenta mound-like, not laminar or peltate; tertiary veins reticulate; hairs of lower leaf surface generally appressed and straight to densely tangled, usually whitish. *P. grandifolium*

Discussion of the *Psidium grandifolium* complex—The *Psidium grandifolium* complex (Landrum 2005; *P. grandifolium*, *P. australe*, *P. missionum*, and *P. suffruticosum*) is taxonomically difficult because of the frequency of intermediate specimens. *Psidium ratterianum* Proença & Soares-Silva of central Brazil probably belongs to this complex (Proença et al. 2011) as well but is not found in Paraguay or Bolivia. I am mainly following my earlier decisions (Landrum 2005) in the present paper. In general, the species are shrubs and subshrubs of campos and cerrado and are adapted to fire, being able to resprout at about ground level from a woody subterranean base after being burnt or cut down. The difficulty in assigning species limits in the complex may be caused by hybridization or by parallel evolution. In Table 1 I compare the four taxa of our area in their most typical states. I have seen *P. grandifolium*, *P. australe*, and *P. missionum* co-occurring in more than one locality of a few hectares in southern Paraguay or northeastern Argentina.

Psidium grandifolium is a species with densely whitish indumentum covering the lower leaf surface and flower buds. There are three more less distinctive morphologies, or morphs, in our area. In northern Paraguay and beyond in Bolivia (northern, morph 1) the leaves are generally stiffly coriaceous at maturity and often oblanceolate to obovate, and the lateral veins are prominent above and below (Fig. 1A,B); the calyx in the bud may be nearly closed, with the closed corolla hidden or nearly hidden by the calyx before anthesis, and the calyx lobes are

not prominent (Fig. 1C,D). In southern Paraguay, and adjacent Argentina, the leaves of *P. grandifolium* tend to be subcoriaceous to coriaceous, but not stiffly so at maturity. These southern plants of Itapua Province, Paraguay and adjacent Misiones and Corrientes Provinces of Argentina can be divided into two additional morphs, 2 and 3. Morph 2 has relatively broad leaves and a nearly closed calyx in the flower bud (Fig. 2A,D) and is similar to the type specimen of the species. Morph 3 has narrow leaves and an open calyx with well-developed calyx-lobes in the flower bud (Fig. 2B,C). This third morph I will call *Itapua-grandifolium* for convenience.

Itapua-grandifolium (morph 3) without its dense indumentum would look very much like *P. missionum*, but the leaf blades in *P. missionum* seem to be more coriaceous than *Itapua-grandifolium*.

Farther north in Paraguari Province, Paraguay *Itapua-grandifolium* is not found, but a kind of *P. missionum* with a moderate amount of indumentum appears, which for convenience I will call *Paraguari-missionum*. *Paraguari-missionum* is generally distinguishable from *P. grandifolium* from the same localities because of its narrower leaves and more clearly defined triangular calyx lobes.

Table 1 – Comparison of the common morphology of each species of the *Psidium grandifolium* complex

Name	Calyx in bud	Leaf surface	Hypanthium surface	Inflorescence	Common leaf shape
<i>P. grandifolium</i>	Nearly closed, tearing irregularly at anthesis	Densely covered with tangled white indumentum below; not lustrous above	Densely covered with tangled white indumentum	Dichasia not common	Elliptic, obovate, oblanceolate; 1.7–3 times as long as wide
<i>P. australe</i> var. <i>australe</i>	Open, the lobes broadly triangular, much wider than long; tears longer than the lobes forming between lobes at anthesis	Moderately covered with appressed hairs to glabrous below [var. <i>argenteum</i> of Brazil densely appressed pubescent]; not lustrous above	Moderately covered with appressed hairs to glabrous	Dichasia not common	Obovate, oblanceolate; 1.5–3.5 times as long as wide
<i>P. suffruticosum</i>	Nearly closed at first, tearing into ca. 5 lobes at anthesis	Glabrous below; lustrous above	Glabrous	Dichasia common	Oblanceolate, narrowly oblanceolate, narrowly elliptic, obovate; 1.7–5.6 times as long as wide
<i>P. missionum</i>	Open, the lobes triangular, slightly wider than long; short tears forming between lobes at anthesis	Glabrous to subglabrous below; not lustrous above	Glabrous to densely covered with appressed hairs	Dichasia not common	Oblanceolate, obovate; 1.8–3.5 times as long as wide

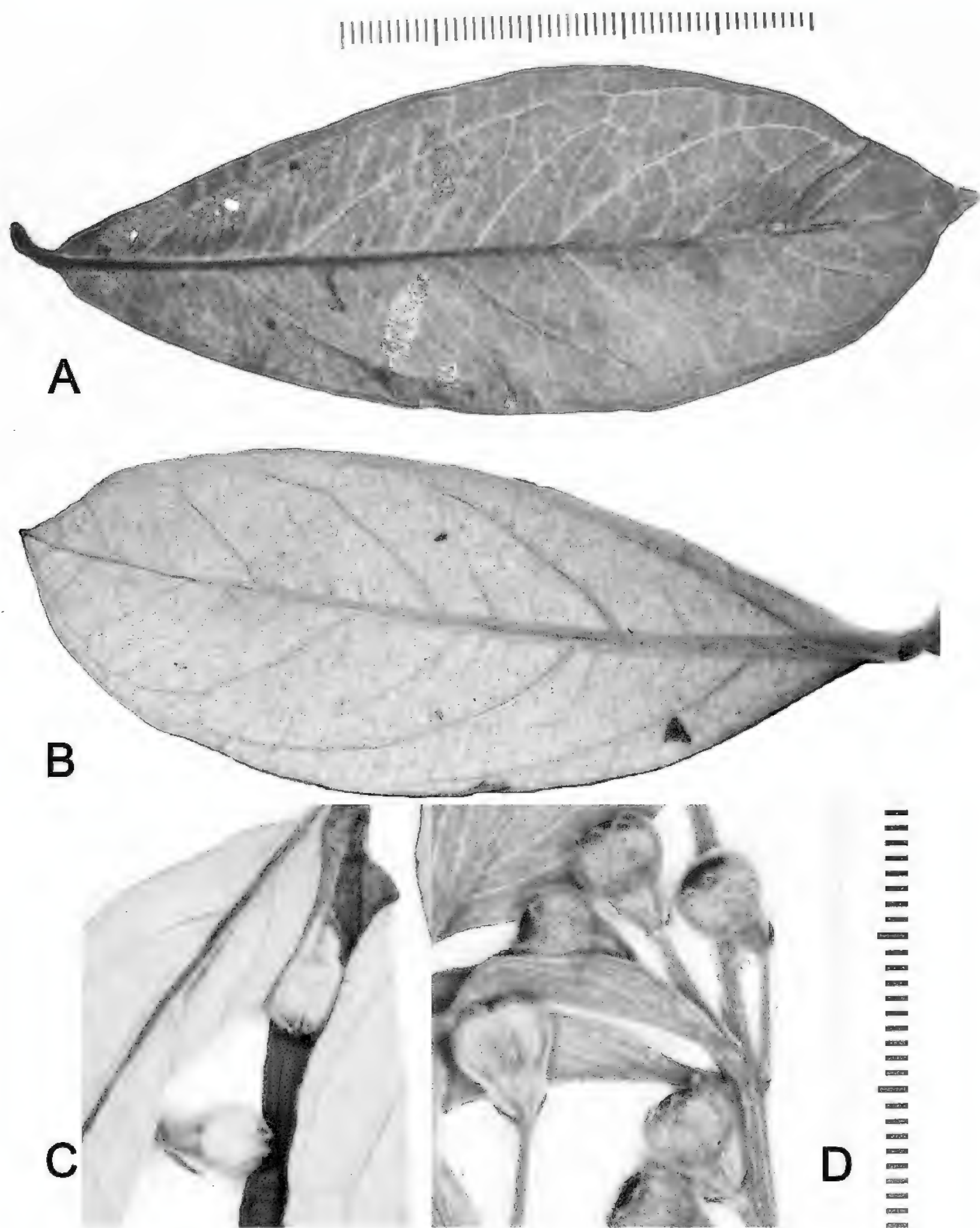


Figure 1. *Psidium grandifolium*, northern morphology (morph 1). A. Paraguay, Canindeyú, upper leaf surface. B. Paraguay, Caaguazú, lower leaf surface. C. Paraguay, Canindeyú, buds. D. Paraguay, San Pedro, buds. Scale bars in mm. (A from Landrum 8855, ASU0006717; B from Zardini & Velázquez 25882, ASU0007314; C from Landrum 8855, ASU0006717; D from Krapovickas et al. 45798, ASU0007386).

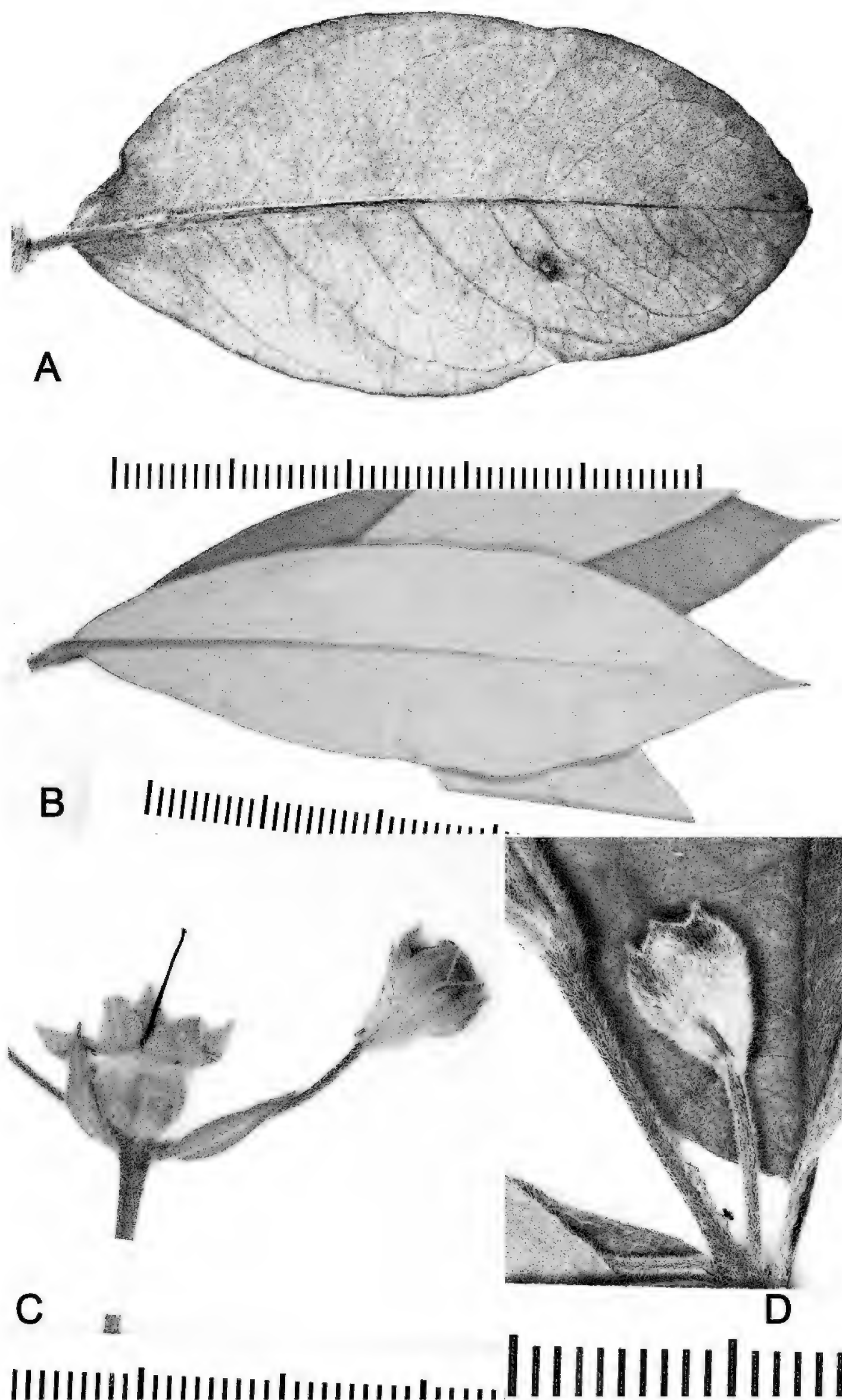


Figure 2. *Psidium grandifolium*, southern morphologies: morph 2(A,D) & morph 3(B,C). Two common leaf shapes: oblong-elliptic (A), and narrowly elliptic (B). Calyx with clearly triangular lobes (C) and calyx nearly closed but with clear lobes (D). Scale bars in mm. (A&D from *Landrum 8823*, ASU0007309; B&C from *Landrum 5709*, ASU0007322).

Thus, *Itapua-grandifolium* and *Paraguari-missionum* seem to represent steps between *P. grandifolium* and *P. missionum* but I have not yet found them from the same area. No formal names will be proposed for now. More field studies or other techniques may help to elucidate these relationships.

I previously recognized *Psidium suffruticosum* as a variety of *P. australe* (Landrum 2005). I find that it is nearly always distinguishable from typical *P. australe*, and problems in distinguishing them may be principally caused by the condition of the specimens. I therefore now accept this taxon at the species level. Differences are found in the key and in discussion of the species.

The distinction between *Psidium australe* and *P. grandifolium* is generally clear in our area, but it is sometimes not clear in parts of Brazil (Minas Gerais to Santa Catarina).

8. *Psidium guajava* L., Sp. Pl. 470. 1753. TYPE. “Habitat in India,” cultivated plant from Hort. Cliff. (LECTOTYPE: BM-628598 [designated by McVaugh, 1989]).

Psidium cujavus L., in Stickman, Herb. Amboin.: 7. 1754. Based on a manuscript of Rumphius? Specimen in LINN (LINN-hl635-6] apparently not *Psidium*.

Psidium pomiferum L., Sp. Pl. ed. 2. 672. 1762. A new superfluous name for *P. guajava*; lectotype of *P. guajava* is cited under this species.

Psidium pyriferum L., Sp. Pl. ed. 2. 672. 1762. TYPE. “in indiis,” “Pluk. Alm. 181,” (possible type material LINN-hl635-1, LINN-hl635-2).

Psidium cujavillus Burm. f., Fl. Ind. 114. 1768. TYPE. “Rumph. Amb. I. p. 145. T. 49,” “Habitat in India,” (HOLOTYPE. Illustration [T. 49] of Rumphius in Herbarium Amboinense).

Psidium angustifolium Lamarck, Encyc. 3: 17. 1789. Lamarck cites same description and illustration of Rumphius that Burmann used (“Rumph. Amb. I. p. 145. T. 49,”), so this is a superfluous name.

Psidium sapidissimum L., Jacq. Pl. Hort. Schoenbr. 3: p. 62. t. 366. 1798. TYPE. Illustration of Jacquin.

Psidium pumilum Vahl, Symb. Bot. 2. 56. 1791. A new superfluous name for *P. cujavillas* Burm.f.

Psidium pumilum var. *rufescens* Blume, Mus. Bot. Lugd. Bat. 1: 71. 1821. TYPE. “In maritimus Archipelagi Indici et Moluccarum,” (No specimen found).

Psidium pumilum var. *intermedium* Blume, Mus. Bot. Lugd. Bat. 1: 72. 1821. TYPE. “In maritimus Javae, Amboinae etc,” (No specimen found).

Psidium pumilum var. *guadalupense* DC., Prodrum 3: 233. 1828. TYPE. “in Guadalupa. Bertero,” (No specimen found.)

Psidium pomiferum var. *sapidissimum* (Jacq.) DC., Prodrum 3: 234. 1828.

Psidium aromaticum Blanco, Fl. Filip. ed. I. 417. 1837. Philippines. Description and vernacular names indicate that this is *P. guajava*. This is a later homonym of *P. aromaticum* Aublet [= *Campomanesia aromatica* (Aublet) Griseb.]

Psidium pyriferum var. *glabrum* Benth., J. Bot. (Hooker) 2: 318. 1840. Nomen nudum.

Psidium fragrans Macfad., Fl. Jamaica 2: 108. 1850. TYPE. Jamaica. “Salt Hill, Port Royal Mountains,” *Macfadyen s.n.* (no specimen found.)

Guajava pumilia (O. Berg) Kuntze, Revis. Gen. Pl. 1: 240. 1891.

Guajava pyrifera (L.) Kuntze, Revis. Gen. Pl. 1: 239. 1891.

Psidium guajava var. *cujavillum* (Burm.f.) Krug & Urb., Bot. Jahrb. Syst. 19: 566. 1894.

Syzygium ellipticum K. Schum. and Lauterb., Fl. Schutzgeb. Südsee: 476. 1900. TYPE. Papua New Guinea. “Bei Finschhafen, in der Nähe von Ibekippo bei Bonga,” “fruchtend am 26. August 1890,” *Lauterbach* 785 (HOLOTYPE: BM?). Illegitimate later homonym of *S. ellipticum* Wall. 1831.

Psidium igatemyense Barb. Rodr., Myrt. Paraguay 10. 1903. TYPE. Paraguay. “vicine Rio Igatemy,” *Hassler* 4753 (HOLOTYPE: G-194284).

Psidium chodatianum Barb. Rodr. ex Chodat & Hassl., Bull. Herb. Boissier 7: 797. 1907, nomen nudum. CITED COLLECTION. Paraguay. “pr. Igatimi,” *Hassler* 4792 (G [2 sheets, = ASU photos]).

Psidium crispum Barb. Rodr. ex Chodat & Hassl., Bull. Herb. Boissier 7: 798. 1907, nomen nudum. CITED COLLECTION. Paraguay. “Cordillera de Altos,” *Hassler* 1442 (G [2 sheets, = ASU photos]).

- Psidium ellipticum* Barb. Rodr. ex Chodat & Hassl., Bull. Herb. Boissier 7: 799. 1907, nomen nudum. CITED COLLECTION. Paraguay. “pr. Igatimi,” *Hassler* 4745 (G [3 sheets, = ASU photos], MICH-1210413!, MPU-10984, NY-1288045!, NY-1288046!, S-r-9450, UC!, W-3585!).
- Psidium subcrenatum* Barb. Rodr. ex Chodat & Hassl., Bull. Herb. Boissier 7: 799. 1907, nomen nudum. CITED COLLECTION. Paraguay. “pr. Bellavista, Apa,” *Hassler* 7793 (G, = ASU photo).
- Psidium globosum* Larrañaga, Escritos D. A. Larrañaga 2: 168. 1923. TYPE. Uruguay. (HOLOTYPE: presumably Larrañaga collection, “Abril 30 de 1814,” “propios para jardines.” No specimen found.)
- Psidium guajava* forma *cujavillum* (Burm. f.) O. Deg. & I. Deg., New Illustr. Fl. Hawaiian Islands [Fam. 273]. 1959.
- Psidium guajava* var. *minor* Mattos, Loefgrenia 70: 5. 1976. TYPE. Brazil. São Paulo, Instituto Agronomico de Campinas. *Mattos* 16234. (HOLOTYPE: HAS 87515 according to SpeciesLink, not seen).

Shrub or tree up to ca. 12 m high, subglabrous to densely appressed pubescent on young growth and lower leaf surfaces, the trunk smooth, light brown to light gray-green, with large flaky scales; *hairs* whitish, yellowish, or silvery, up to ca. 0.7 mm long, erect or appressed; *young twigs* quadrangular, slightly to strongly winged, often sulcate (at least when dry), densely to moderately appressed-pubescent, the older twigs at first scaly with longitudinal striations or fibers, eventually smooth with irregular scales falling as patches. LEAVES elliptic, oblong, elliptic-oblongate, elliptic-obovate, or lanceolate, 4.5–14 cm long, 2.4–7.5 cm wide, 1.6–4 times as long as wide, densely to sparsely appressed pubescent below, subglabrous except for puberulent midvein above, the immature leaves covering the twig apex in 2 decussate pairs; *apex* acute, acuminate, to rounded; *base* rounded to slightly cordate; *petiole* 2–5 mm long, 1–2 mm thick, channeled, densely pubescent to subglabrous; *venation* brochidodromous distally to eucamptodromous proximally, the midvein impressed above, prominent below, the lateral veins 9–22 prominent pairs, ascending at angle of ca. 45°, nearly straight, curving toward apex near the margin and connecting with the next lateral, the marginal vein not clearly present or arching between the laterals, the tertiary veins connecting the laterals in a ladder-like to reticulate pattern; *blades* coriaceous to submembranous, drying yellow-green, gray-green, to dark reddish brown. FLOWER BUDS subfusiform to pyriform, 9–14 mm long, sometimes strongly constricted near the midpoint, the hypanthium narrowly campanulate, barrel shaped or fusiform 4–6 mm long, the distal portion of bud more or less ovoid, sometimes strongly so with a conical apex, 4.5–9.5 mm long; *indumentum pattern of buds* with peduncles, hypanthium, and bracteoles sparsely to moderately appressed pubescent, the calyx without glabrous to sparsely pubescent (usually less densely covered than that hypanthium), the calyx glabrous or densely pubescent within, the petals, disk, and style glabrous; *peduncles* 1–3-flowered, 1–3.5 cm long, 1–1.5 mm thick, terete; *bracteoles* linear to narrowly triangular, 2–5 mm long. CALYX closed, tearing irregularly as the bud opens, persisting or falling in ca. 3 parts; *petals* obovate to elliptic, 13–22 mm long; *disk* 4–6 mm across; *stamens* 280–720, 7–15 mm long; *anthers* 0.7–1 mm long, with 1–7(–10) glands; *style* 10–15 mm long; *ovary* 3–6-locular; *ovules* 90–180 per locule, multiseriate. FRUIT globose to pyriform, 2–6(–8) cm long, green to yellow without, with pink, yellow, or white flesh, aromatic; *seeds* 100–400, perhaps more in large fruits, subreniform to subtriangular, 2–4 mm long, more or less smooth, the seed coat 0.2–0.25 mm thick at narrowest point. $2n = 22, 44$. (Fig. 10).

Representative specimens examined. ARGENTINA. Chaco: San Fernando, río Paraná, Isla Soto (ca. 27.8°S, 58.83°W), 28 Nov 1978, *Renvoize* 3655 (ASU0007439). Corrientes: Dep. General Paz, Arroyo Sta. Isabel at ruta 12 E of Ita Ibate, (ca. 27.3333°S, 57.5°W), 9 Dec 1987 (fl), *Landrum et al.* 5677 (ASU0004998, CTES); Dep. General Paz, between Rosario and Lomas de Vallejos on ruta 5 (27.75°S, 57.5°W), 12 Dec 1987 (fl), *Landrum et al.* 5742 (ASU0004995, CTES); Dep. Empedrado, Estancia La Yela (ca. 27.95°S, 58.8°W), 2 Dec 1994 (fl), *Pedersen* 16180 (ASU0007428, MBM); Dep. General Paz, Ea. La Tilita, 3 km W de Ita Ibate, ruta

THE GENUS *PSIDIUM* (MYRTACEAE) IN BOLIVIA AND PARAGUAY

prov 13, a 5 km SW de ruta 12, cerca de casco de la estancia (ca. 27.75°S, 57.62°W), 20 May 1998 (fl), *Torres 4* (ASU0007399, CTES). **Formosa:** Pilcomayo, Dep. Pilcomayo, Sol de Mayo, 14 km SW de Laguna Blanca (58°25'W, 25°7'S), 25 Oct 1995 (fl), *A. Schinini & G. Cuadrado 30328* (ASU0007427). **Jujuy:** Ledesma, 4 km pasando río Agua Negra, camino a Valle Grande (ca. 23.8342°S, 64.7919°W), 23 Oct 1971 (fl), *Legname & Cuezso 8752* (LIL); Dep. Calilegua, Parque Nacional Calilegua, Mesada de Las Colmenas, Ruta 83 km 21, (ca. 23.7606°S, 64.8503°W), 1200 m, 27 Nov 2004 (fl), *Novara et al. 12125* (ASU0052982, MCNS). **Misiones:** Puerto Iguazú (ca. 25.5968°S, 54.5686°W), 13 Apr 57 (fl), *Cuezso & de la Sota 1594* (MO); Dep. El Dorado, Ruta 17, paraje Pozo Azul, Aldea Guaraní Teko'a Arandu (ca. 26.3465°S, 54.1518°W), 10 Dec 2003 (yfr), *Keller & Acosta 2569* (ASU0083563); San Ignacio, near Paraná River, ca. 8 km SW of San Ignacio, ca. 1 km, before Peña Victoria (ca. 27°15'S, 55°35'W), 10 Dec 1987 (yfr), *Landrum et al. 5726* (ASU0005003, CTES). **Salta:** Dep. Santa Victoria, Serranía Finca Arazayal sobre arroyo Arazayal, afluente del Bermejo, 19 km al NW de Aguas Blancas, 22°40'S 64°26'W, 650 m, 4 Dec 2005 (yfr), *Arbo et al. 9009* (ASU0057302, CTES, MCNS); Oran, camino a Finca de Yaculika, a ca. 5 km de Puente Intern. del río Bermejo, 480 m, 6 Nov 1975 (fl), *Figueroa et al. 11923* (CAS).

BOLIVIA. **El Beni:** Prov. Vaca Díez, Chacobo village Alto Ivón (11°45'S, 66°02'W), 200 m, 1 Dec 1983 (fl), *Boom 4068* (CAS); Yacuma, 1 km E of the Río Matos, then 6 km S on track, Estancia La Pascana (ca. 14.82°S, 66.33°W), 250 m, 4 Nov 1985, *Solomon 14552* (MO). **Cochabamba:** Prov. Carrasco, Sajta propiedad de la Universidad, 17°05'54"S, 64°43'50" W, 219 m, 22 Oct 2009 (fl), *Teran et al. 4206* (ASU0080861). **La Paz.** Tipuani-Guanai, *Bang 1688* (MO). **Pando:** Cocamita, (11°11'S, 68°41'W), 260 m, 27 Oct 1987 (yfr), *Buchanan-Smith 78* (ASU0007441); Prov. Nicolás Suárez, Bajo Avemano (ca. 10.964065°S, 68.047751°W), 1 Sep 1990 (yfr), *Gonzales 92* (ASU0060505). **Santa Cruz:** Prov. Velasco, Reserva Ecologica El Refugio, a 300 m al SO del campamento, en la pampa de Las Islas (14°47'9" S; 61°3'14"W), 150 m, 21 Jan 1995 (fr), *Guillén & Chore 2945* (ASU0007463, MO); Prov. Ñuflo de Chávez, Lomerío, campamento Las Trancas, parcelas permanentes de BOLFOR, (16°35'46"S, 61°51'58"W), 450 m, 19 Nov 1994 (fr), *Guillén & Medina 2605* (ASU0007464); Prov. Andrés Ibáñez, along road from Santa Cruz to Samaipata, 1 km SW of Angostura (18°15'S, 63°31'W), 650 m, 13 Jan 1987 (fr), *Nee 33462* (ASU0007408, NY); Prov. Ichilo, 7 km N of Buena Vista, N end of Laguna Madrejon (17°23'S, 63°40'W), 295 m, 31 Oct 1990 (fl), *Nee 39638* (ASU0007410, NY); Prov. Sara, near río Asuvicito, 0.5 km N of abandoned railroad line, 15.5 km N of Portachuelo on road to Loma Alta 17°13'S, 64°24'30"W, 260 m, 20 Dec 1995 (fr), *Nee 46389* (ASU0007461, NY); Prov. Andrés Ibáñez, 1 km al NW del centro de Santa Cruz (17°46'30"S, 63°11'35"W), 415 m, 20 Apr 1988 (fl), *Saldias 323* (ASU0007420).

PARAGUAY. **Amambay:** Bella Vista, 2 km S of town, ranch of Felix Ocariz (56°30'W, 22°10'S), 22 Mar 1983 (fr), *Hahn 1279* (ASU0007433, MO, PY); Parque Nacional Cerro Corá, NE limit of Parque, Naranja-hai (ca. 22°35'S, 56°5'W), 150 m, 20 Aug 1995 (st), *Landrum 8711* (ASU0007451, FCQ). **Caaguazú:** Arroyo Yakare'i, along northern side from route 2 (ca. 25.4696°S, 56.0153°W), 8 Feb 1989 (fr), *Zardini & Aguayo 10715* (ASU0060491, MO). **Caazapá:** Tavaí, Destacamento Militar (ca. 26°10'S, 55°20'W), 6 Aug 1989 (fr), *Basualdo 2672* (FCQ). **Canindeyú:** Ygatimi Reserva Natural del Bosque Mbaracayu, Valtinotti Cue, (ca. 24°10'S, 55°40'W), 18 Nov 1995 (yfr), *Landrum & Basualdo 8843* (ASU0007448). **Central:** Tavarory, río Paraguay (25°28'20.6"S, 57°33'3.1"W), 100 m, 17 Jul 1995 (st), *Landrum et al. 8564* (ASU0007465, FCQ); Estero del Ypoá, 13 km SW of Nueva Italia, NW of Pindoty (ca. 25°20'S 57°28'W), 27 Jan 1990 (yfr), *Zardini & Velásquez 18503* (ASU0052805). **Concepción.** 1–2 km SE of Arroyo Tagatiyá-Mi (ca. 22°38'S, 57°31'W), 16 Mar 1994 (fl), *Zardini 38840* (ASU0018602); Paso Horqueta, Río Aquidaban (ca. 23°07'S, 57°20'W), 18 Nov 1993 (fl), *Zardini & Tilleria 37474* (ASU0018589). **Cordillera:** Río Salado basin on road to Arroyos y Esteros (ca. 25°09'S 57°30'W), 21 Jul 1990 (fl), *Zardini & Velásquez 22329* (ASU0052806, MO); Confluente of río Paraguay and Río Salado, along Río Salado (ca. 25.15°S, 57.5°W), 4 Aug 1990 (yfr), *Zardini & Velásquez 22767* (ASU0007455, MO). **Guaira:** Cordillera de Ybytyruzú, destacamento de Tororo (ca. 25°55'S, 56°15'W), 400 m, 11 Nov 1988 (fl), *Zardini 7951* (ASU0052798). **Itapúa:** Opposite Puerto Piray, Misiones Prov. Argentina (ca. 26.4586°S, 54.725°W), 200 m, 23 Oct 1978 (fl), *S. A. Renvoize et al. 3225* (ASU0007440). **Misiones:** Río Tebicuary, (26°23'43"S, 57°07'45"W), 28 Jul 1994 (fr), *Zardini & Guerrero 40153* (ASU0018593). **Paraguarí:** Acahay, Cerro Acahay, ca. 5 km from main highway, near area of rock extraction (ca. 25.8333°S, 57.1667°W), 3 Aug 1995 (fr), *Landrum 8618* (ASU0007459); road to Lago Ypoá, ca. 23 km N of Caapucú, 3.5 km W of main Asunción-Encarnación Highway (26°S, 57.25°W), 250 m, 10 Nov 1995 (fl), *Landrum 8833* (ASU0007422, FQC); between Nueva Italia and Carapeguá, 30.2 km SE of Nueva Italia (25°43'S, 57°16'W), 14 Dec 1989 (fl), *Zardini & Velásquez 16734* (ASU0052804); Estero del Ypoá, Trinchera Cué (ca. 25°53'S, 57°23'W), 5 Aug 1993 (st), *Zardini & Tilleria 36818* (ASU0018597). **Presidente Hayes:** cuenca de Río Pilcomayo, Fortin Gral. Delgado (24°31'S, 59°19'W), 100 m, 12 Nov 1985 (fl), *Brunner 1377* (PY); along Río Paraguay, ca. 3 km NW of Puente Remanso connecting Asunción and Villa Hayes (ca. 25.33°S, 57.66°W), 15 Dec 1995 (yfr), *Landrum*

8877 (ASU0007449); Pto. Militar (ca. 23°25'S, 57°29'W), 9 Dec 1989 (fl), *Mereles 3451* (FCQ). **San Pedro:** 7 km al S del cruce a Lima (ca. 23°9'S, 56°5'W), 15 Dec 1986 (fl), *Perez et al. 1480* (PY).

PERU. Madre de Dios: Tambopata, 30 air km SSW of Puerto Maldonado at effulgence of Río Tabopata (12°49'S, 69°17'W), 260 m, 5 Dec 1980 (fr), *Barbour 5263* (MO).

Phenology—Flowering mainly in October and November; fruiting throughout year but mainly from January to September.

Habitat and Distribution—Disturbed areas such as roadsides, pastures, and also frequently cultivated, from near sea level to 1000 m. Widely distributed as a cultivated and escaped-weedy species in tropical and subtropical regions around the world.

Common names—Goiaba (Portuguese); guayaba (Spanish); guava (English); gobaya (French Guiana).

Distinguishing Features—Calyx closed in flower bud or open only as a terminal pore, tearing irregularly as the bud opens, usually in 2 or 3 parts; lateral veins usually more than 10 pairs; hairs on lower leaf surface appressed, whitish, or silvery.

Psidium guajava is frequently confused with similar *P. guineense*; they have been hypothesized to hybridize (Landrum et al. 1995). They are contrasted in the key below.

1. Lateral veins usually 9–22 pairs; young twigs quadrangular, more or less winged; indumentum of lower leaf surface appressed, whitish, yellowish, or silvery; calyx usually tearing into 2 or 3 parts; anthers 0.7–1 mm long, usually with less than 10 glands. *P. guajava*
- 1' Lateral veins 5–10 pairs; young twigs more or less terete or compressed (some vigorous shoots sometimes 4-winged); indumentum of lower leaf surface more or less erect, reddish brown, or less often appressed, whitish or grayish; calyx usually tearing into 4 or 5 parts; anthers 1–3 mm long, usually with more than 10 glands. *P. guineense*

The earliest archaeological remains known that are thought to be of *Psidium guajava* come from South American sites (Arévalo-Marín et al. 2021). The oldest is from Teotonio, Rondônia, Brazil (5000 – 9000 cal. BP), a locality especially good for fishing along the Madeira River (a tributary of the Amazon River) with evidence of human habitation as early as 9000 years ago. Evidence of other edible plants includes remains of squash (*Cucurbita* sp.), beans (*Phaseolus vulgaris* L.), manioc (*Manihot esculenta*), pequiá (*Caryocar* sp.) (Watling et al. 2018). There are several sites on the coast of Peru that are as much as 6000 years old (Arévalo-Marín et al. 2021). Other plants such as squash, beans, camote (*Ipomoea batatas* [L.] Lam.), and cotton (*Gossypium barbadense* L.), were grown at Caral, Peru (ca. 4000 years ago), for instance, but not corn (*Zea mays* L.) (Shady Solís et al. 2001). These South American sites are quite different in climate and separated by the Andes mountain range, but geographically separated by only 1500 km. So, for the present this part of South America between coastal Peru and the Amazon basin seems like a likely area of origin for cultivated *Psidium guajava*. It is also an area where a narrow endemic relative, *P. rutidocarpum* Ruiz & Pav., grows (Landrum 2021a).

In Central America and Mexico the earliest archeological record of *P. guajava* is about 2000 years old in the Tehuacán Valley of Mexico (Smith 1965). The earliest records of peanut (*Arachis hypogaea* L., another cultivated plant from South America) in Mexico are also from the Tehuacán Valley and of the same approximate age (Smith 1965).

By the time of European contact *Psidium guajava* was widely cultivated in the Caribbean region and various cultivars had been selected according to Fernandez de Oviedo y Valdez (1851, vol. 1, p. 304) who wrote his account in the early 1500s.

It is interesting that “goiaba” is the common name frequently used for this species in Brazil, a variant of “guayaba” reported by Fernández de Oviedo y Valdés (1851) and the name frequently used in Spanish speaking countries. Other species of *Psidium* in Brazil are usually called “araçá” (Legrand and Klein 1977), a name from Guaraní. So, it is possible that *P. guajava* is a relatively recent arrival in much of Brazil (Landrum 2021a).

9. *Psidium guineense* Sw., Prodr. 77. 1788. TYPE. “Insula principis Africes, in Domingo culta.” On type specimens: “Culta in Hispaniola,” “ex Africa”. Presumably, *Swartz s.n.* (HOLOTYPE: S-r-5302; ISOTYPES: BM-616940, SBT-12641).

Psidium polycarpon Lambert, Trans. Linn. Soc. London 11: 231. 1813. TYPE. “indigenous to the grassy savannahs of Trinidad; from whence plants were sent to the St. Vicent’s garden in 1792,” (HOLOTYPE: BM; ISOTYPE: MICH-1210424!, W [= ASU photo]).

Psidium araca Raddi, Opusc. Sci. Bologna 4: 252. pl. 7, fig. 2. 1815. TYPE. Brazil. Rio-Janeiro. (HOLOTYPE: FI-5202).

Campomanesia tomentosa HBK, Nov. Gen. et Sp. 6: 151. 1823. TYPE. Colombia. “prope Ibaguè Novo-Granatensium,” *Humboldt and Bonpland s.n.* (HOLOTYPE: P-679485; ISOTYPE: F! [= ASU photo]).

Psidium dichotomum Weinm. Syll. Ratisb. 2: 166. 1828. TYPE. Brazil. “In Brasilia,” (probable HOLOTYPE: LE [= ASU photo]).

Psidium hians DC., Prodr. 3: 234. 1828. TYPE. Brazil. “ad Vaodo Parana in Tabuleiro et Catingas,” *Martius [1791]* (SYNTYPES: M-32376 [annotated by de Candolle], M-32377 [with description by Martius used by de Candolle], M-146873!). This was mistakenly considered a synonym of *Campomanesia pubescens* by Landrum (1986).

Psidium multiflorum Cambess. in Saint-Hilaire, Fl. Bras. merid. 2: 281. 1833. TYPE. Brazil. “In sylvis caeduis prope urbem S. Pauli,” *Saint-Hilaire s.n.* (SYNTYPES: P-258410!, P-258411!, P-258412!). Cambessède named a separate species (p. 287) *Psidium multiflorum*, based on a separate collection (P-1902177! the apparent holotype, and MPU-10990 an isotype), that is *Campomanesia pubescens* (DC.) O. Berg.

Psidium molle Bertol. in Alessandrini, Nuovi Ann. Sci. Nat. 3: 136. 1840. Later again published in Fl. Guatimal. 22, Tab. IX. 1840 (see Baldini et al. 2019). TYPE. Guatemala. (HOLOTYPE: *Velasquez s.n.* BOLO0508016, seen as digital image, = ASU0310765).

Psidium sericiflorum Benth., Pl. hartw. 176. 1845. TYPE. Ecuador. “In campis circa Popayan,” *Hartweg 980* (possible HOLOTYPE: K-565585 [labeled “possible isotype”]; ISOTYPES: BM-796855, F-65716!, LD-1514512).

Psidium schiedeana O. Berg, Linnaea 27: 368. 1856. TYPE. Mexico. *Schiede 541* (HOLOTYPE: B, lost). Possible original material: LE-7006 (*Schiede 512*) annotated specimen by Berg as *P. schiedeana*.

Psidium molle var. *robustum* O. Berg, Linnaea 27: 370. 1856. TYPE. [Guatemala]. “In monte Candelaria,” *Oersted 21* (HOLOTYPE: C-10015956).

Psidium molle var. *gracile* O. Berg, Linnaea 27: 370. 1856. TYPE. Costa Rica. “Irasu,” *Oersted 27* (HOLOTYPE: C-10015957).

Psidium laurifolium O. Berg, Linnaea 27: 364. 1856. TYPE. Nicaragua. “in monte Masaya in Costa Rica,” *Oersted s.n.* (HOLOTYPE: C-10015959).

Psidium costaricense O. Berg, Linnaea 27: 368. 1856. TYPE. Costa Rica. “ad Iaru [Irazú] in Costa Rica,” *Oersted 17* (HOLOTYPE: C-10015950).

Psidium benthamianum O. Berg, Linnaea 27: 362. 1856. TYPE. Guyana [“Guiana Anglica”]. *Rob. Schomburgk 836* (SYNTYPE: B, lost; ISOSYNTYPES: BM-796849, G-227697!, K-170097, K-170098, MICH-1210415!, P-258486!, W-46097!) and *Rich. Schomburgk 314* (SYNTYPE: B, lost).

Psidium ooideum O. Berg, in Mart., Fl. bras. 14(1): 398. 1857. TYPE. Brazil. “prov. S. Pauli,” *Sellow s.n.* (HOLOTYPE: B, lost; ISOTYPES: P-2428285, K-170093).

Psidium hians var. *truncatum* O. Berg, in Mart., Fl. bras. 14(1): 394. 1857. Illegitimate name to be replaced by the autonym *P. hians* var. *hians* because Berg cites *P. hians* under this variety.

Psidium hians var. *cuneatum* O. Berg, in Mart., Fl. bras. 14(1): 394. 1857. TYPE. Brazil. Locality unclear. *Sellow s.n.* (HOLOTYPE: B, lost; ISOTYPE: K-170094). An additional specimen annotated by Berg but not cited is *Pohl 2154* [=W-48022!].

- Psidium ypanemense* O. Berg, in Mart., Fl. bras. 14(1): 395. 1857. TYPE. Brazil. “v. in hb. Mart. et Berol,” “ad pagum Ypanema in prov. S. Pauli,” *Raben* 757 (SYNTYPE: BR-843781) and *Sellow s.n.* (SYNTYPE: BR-843783; ISOSYNTYPES: K-565299, LE-7014, W-46099!).
- Psidium ooideum* var. *parvifolium* O. Berg, in Mart., Fl. bras. 14(1): 602. 1859. Illegitimate name to be replaced by the autonym *P. ooideum* var. *ooideum* because Berg considers it to include the type of the species.
- Psidium ooideum* var. *intermedium* O. Berg, in Mart., Fl. bras. 14(1): 602. 1859. TYPE. Brazil. “prope Batataes,” *Riedel* [2293]. (HOLOTYPE: LE-6994).
- Psidium ooideum* var. *grandifolium* O. Berg, in Mart., Fl. bras. 14(1): 602. 1859. TYPE. Brazil. “prope Batataes et Itu,” *Riedel* [2059] (SYNTYPES: LE-6989, LE-6990, LE-6991, LE-6992, LE-6993; ISOSYNTYPES: G-227729!, P-258402!, P-258403!).
- Guajava ypanemensis* (O. Berg) Kuntze, Revis. Gen. Pl. 1: 239. 1891.
- Guajava polycarpa* (Lambert) Kuntze, Revis. Gen. Pl. 1: 239. 1891.
- Guajava multiflora* (Cambess.) Kuntze, Revis. Gen. Pl. 1: 239. 1891.
- Guajava hians* (O. Berg) Kuntze, Revis. Gen. Pl. 1: 239. 1891.
- Guajava rubescens* (O. Berg) Kuntze, Revis. Gen. Pl. 1: 239. 1891.
- Guajava guineensis* (Sw.) Kuntze, Revis. Gen. Pl. 1: 239. 1891.
- Guajava ooidea* (O. Berg) Kuntze, Revis. Gen. Pl. 1: 239. 1891.
- Guajava schiedeana* (O. Berg) Kuntze, Revis. Gen. Pl. 1: 240. 1891.
- Guajava costaricensis* (O. Berg) Kuntze, Revis. Gen. Pl. 1: 240. 1891.
- Guajava laurifolia* (O. Berg) Kuntze, Revis. Gen. Pl. 1: 240. 1891.
- Guajava mollis* (Bertol.) Kuntze, Revis. Gen. Pl. 1: 240. 1891.
- Guajava benthamiana* (O. Berg) Kuntze, Revis. Gen. Pl. 1: 240. 1891.
- Psidium ooideum* var. *longipedunculatum* Rusby, Mem. Torrey Bot. Club 3(3): 27. 1893. TYPE. Bolivia. “Yungas,” *Bang* 287 (HOLOTYPE: NY-1288067!; ISOTYPES: BM-1125476, CORD-3582, E-504661, F-42755, M-146745!, MICH!, PH-22411, PUL-384, R-162777!, US-117670, W-1372!).
- Psidium hasslerianum* Barb. Rodr., Myrt. Paraguay 9. 1903. TYPE. Paraguay. “prope Igatemy, ad Brasil,” *Hassler* 4870 (HOLOTYPE: G-194091).
- Psidium lehmannii* Diels, Bot. Jahrb. Syst. 37: 594. 1906. TYPE. Colombia. “circ. Popayan 1000-1800 m,” *Lehmann, F. C.* 5820 (HOLOTYPE: B, lost; ISOTYPES: K-170070, NY-887977).
- Psidium cordillerense* Barb. Rodr. ex Chodat & Hassl., Bull. Herb. Boissier 7: 799. 1907, nomen nudum. CITED COLLECTIONS. Paraguay. “Cordillera de Altos,” *Hassler* 1689 (G!) as well as “in campis Nu-guazu,” *Hassler* 1687 (G!) and *Hassler* 1723 (G!, BM-511342, K-170078, P-258474!).
- Psidium glandulosum* Barb. Rodr. ex Chodat & Hassl., Bull. Herb. Boissier 7: 799. 1907, nomen nudum. CITED COLLECTION. Paraguay. “Cordillera de Piribebuy,” *Hassler* 6633 (G [3 sheets, = ASU photos]).
- Psidium macrophyllum* Barb. Rodr. ex Chodat & Hassl., Bull. Herb. Boissier 7: 797. 1907, nomen nudum. CITED COLLECTION. Paraguay. “Cordillera de Altos,” *Hassler* 3393 (G [4 sheets, = ASU photos], BM-511324, K-565295, NY-1288061!, P-258427!, P-258428!, W-2678!).
- Psidium tomasense* Barb. Rodr. ex Chodat & Hassl., Bull. Herb. Boissier 7: 797. 1907, nomen nudum. CITED COLLECTION. Paraguay. “in Colle So-Tomas,” *Hassler* 6554 (G [3 sheets, = ASU photos], A-71261, MICH-1210420!, MPU-10993, NY-1288093!, P-258360!, P-258361!, S-r-9460, W-763!).
- Psidium laurifolium* Barb. Rodr. ex Chodat & Hassl., Bull. Herb. Boissier 7: 797. 1907, nomen nudum. CITED COLLECTION. Paraguay. “pr. Igatimi,” *Hassler* 4762 (G [3 sheets, = ASU photos]).
- Psidium atiraense* Barb. Rodr. ex Chodat & Hassl., Bull. Herb. Boissier 7: 799. 1907, nomen nudum. CITED COLLECTIONS. Paraguay. “pr. Atira [3641] and in valle fluminis Y-aca pr. Chololo [6751],” *Hassler* 3641 (G [3 sheets, = ASU photos], K-565296, NY-1288033!) and *Hassler* 6751 (G, BM-511341).
- Psidium schippii* Standley, Publ. Field Mus., Bot. 8: 319. 1931. TYPE. Belize. “All Pines,” *Schipp* 595 (HOLOTYPE: F-65683; ISOTYPES: G-227694!, K-565291, MICH-1210422!, NY-1288088!).
- Psidium rotundifolium* Standley, Publ. Field Mus., Bot. 8: 318. 1931. TYPE. Belize. “All Pines,” *Schipp* S-85 (HOLOTYPE: F-65682; ISOTYPES: G-227693!, MICH-1210423!, MO!, NY-1288084!, WIS-v0255107).
- Mosiera guineensis* (Sw.) Bisse, Revista Jard. Bot. Nac. Univ. Habana 6(3): 4. 1986 [“1985”].

Shrub or small tree up to about 6 m high, typically densely covered with velvety to subtomentose indumentum on the inflorescence and young growth but sometimes nearly glabrous, the trunk smooth to scaly; *hairs* simple, spreading (loosely appressed) to erect, often tangled together, grayish to reddish brown, ca. 0.3–0.5 mm long; *young twigs* densely to moderately velutinous, or less often glabrous, compressed to terete in section, losing

indumentum in about 1 year, usually not angled but sometimes grooved when young, vigorous shoots sometimes weakly angled, the older bark usually remaining more or less smooth, less often somewhat flaky or stringy. LEAVES elliptic, elliptic-oblong, obovate, 4–11.5 cm long, 2–8 cm wide, 1.3–2.4 times as long as wide, usually densely to moderately velutinous below, glabrous to covered with hairs along the midvein above, the margin entire; *apex* obtuse, rounded, or acute; *base* rounded to acute; *petiole* 4–12 mm long, 1.5–2 mm thick, channeled, densely to sparsely pubescent, rarely glabrous; *venation* brochidodromous to eucamptodromous distally, the midvein impressed or nearly flat above, prominent below, the lateral veins 5–10 pairs, ascending at an angle of ca. 45°, diminishing and looping near the margin to connect with the next lateral, a clear marginal vein not formed, the tertiary veins, connecting the laterals in a ladder-like to reticulate pattern; *blades* coriaceous, drying yellowish brown to reddish brown, concolorous to somewhat darker above, when dry often mottled and/or lustrous above. FLOWER BUDS pyriform, 8–15(–17) mm long, the hypanthium ellipsoid to obconic, 3.5–7 mm long, the distal portion of bud ellipsoid, subglobose, or ovoid, 4.5–10 mm long; *indumentum pattern of buds* with all external surfaces moderately to densely pubescent (rarely subglabrous), the calyx pubescent without, but less densely so than hypanthium, distally pubescent within, the petals pubescent without, the disk sparsely pubescent (less often glabrous), the style glabrous; *peduncles* terete to compressed, 9–25(–30) mm long, 1–2 mm wide, uniflorous or triflorous, the branches of the dichasium when present 2–12 mm long; *bracteoles* narrowly triangular, ca. 2–3 mm long, caducous at about anthesis. CALYX closed completely, or with a terminal, pore-like opening at the apex, tearing longitudinally to the staminal ring, usually in 5 parts, these sometimes persisting until the fruit matures, the margin of calyx pore if present sinuate or with 5 small lobes; *petals* elliptic to obovate, concave, 7–15 mm long, 7–10 mm wide, sometimes more than 5; *disk* 4–5 mm across; *stamens* 180–300, 7–10 mm long; *anthers* 1–3 mm long, more or less introrsely dehiscent, the glands in the connective 1 to over 50; *style* 8–12 mm long; *ovary* 3–5-locular; *ovules* 50–100 per locule, ca. 8-seriate. FRUIT subglobose to ellipsoidal, 1–3 cm long; *seeds* 19–250 per fruit, 2.5–5 mm long, the seed coat 0.2–0.3 mm thick at narrowest point. $2n = 44$. (Fig. 11).

Representative specimens examined. **ARGENTINA.** **Corrientes:** Empedrado, Estancia Las Tres Marias, 18 Dec 1974 (fl), *Burkart 31006* (MICH); Dep. Ituzaingó, 7 km S of Río Aguapey on Ruta 39 (ca. 27.5833°S, 56.25°W), 9 Dec 1987 (fl), *Landrum et al. 5708* (ASU0004996); Dep. General Paz, Arroyo Sta. Isabel at ruta 12 E of Ita Ibate (ca. 27.3333°S, 57.5°W), 9 Dec 1987 (fl, yfr), *Landrum et al. 5676* (ASU0004988, CTES), *Landrum 5682* (ASU0004999, CTES); Dep. Ituzaingó, Arroyo Garape, 45 km al E de Ituzaingó, 11 Dec 1974 (yfr), *Quarin et al. 2830* (MICH); Dep. Empedrado, R. Paraná near Ao. Sombrero (ca. 27.952°S, 58.804°W), 27 Nov 1978 (fl), *Remvoize 3634* (ASU0007555); Dep. Santo Tomé, Paraje Galarza, (ca. 28°06'02"S, 56°40'W), 30 Oct 2001 (fl), *Schinini et al. 35655* (ASU0069697, CTES); Isla Apipé Grande, Pto. Arazá (ca. 27.5°S, 56.9°W), 26 Nov 1988 (fl, yfr), *Tressens et al. 3470* (ASU0007486, CTES). **Misiones:** Posadas, La Granja, 21 Nov 1907 (fl), *Ekman 2041* (MICH, NY); San Ignacio, Peña Victoria, on Paraná River ca. 8 km SW of San Ignacio (ca. 27.25°S, 55.583°W), 10 Dec 1987 (fl), *Landrum et al. 5723* (ASU0005002, CTES); Iguazú, Puerto Segundo, km 17, 24 Oct 1950 (fl), *Montes 9520* (NY); Cainguas, Monte Carlo, 205 m, 23 Feb 1955 (fr), *Montes 14789* (CAS, NY); Candelaria, 2 Feb 1945 (fl), *Schwarz 621* (NY); San Ignacio, Teyú Cuaré, 3 km S de Gendarmeria (ca. 27.26°S, 55.53°W), 10 Dec 1987 (fr), *Vanni 1067* (ASU0007489, CTES). **Salta:** Santa Victoria, Los Toldos, Reserva Nacional El Nogalar de Los Toldos (ca. 22.28°S, 64.70°W), 1639 m, 10 Jan 2010 (fl), *Del Valle* (MCNS); Santa Victoria, volviendo del PN Baritú, Vallecito, 28 Apr 2008 (fr), *Hilgert 2639* (MCNS); Santa Victoria, Nacientes del Bermejo, frente a Momora, entre El Condado y Campo de Cazón, 22 km N de Los Toldos (ca. 22°S, 64.96°W), 1100–1400 m, 29 Oct 1987 (fl), *Novara 7074* (MCNS).

BOLIVIA. **Beni:** Prov. Ballivián, Espíritu, 200 m, 28 Sep 1979 (fl), *Beck 2531* (MICH); Prov. Marbán, San Rafael, 220 m, 6 Oct 1979 (fl, fr), *Beck 2672* (MICH); Yacuma, 1 km E of the Río Matos, then 6 km S on track, Estancia La Pascana (14°49'S, 66°20'W), 250 m, 4 Nov 1985 (fl), *Solomon 14564* (ASU0007528); **Chuquisaca:** Prov. Hernando Silas, Mun. Huacareta, cima Serranía Los Milagros, Laguna Milagros (20°19'46"S, 64°02'32"W), 1854 m, 25 Dec 2005 (fl), *Serrano et al. 6900* (ASU0080866). **La Paz:** Prov. Franz Tamayo,

Parque Nacional Madidi, Río Tuichi, arroyo Pintata (14°26'34"S, 68°34'47"W), 1150 m, 4 Dec 2005 (fl), *Araujo-M. et al.* 2629 (ASU0053041); Prov. Inquisivi, comunidad Khora-Charapampa, cuenca del río Miquillas, ruinas en terrazas, aprox. 22 km al N de Choquetanga (16°40'S, 67°20'W), 1340 m, (fl), *Salinas* 2924 (ASU0053025, LPB); Prov. Nor Yungas, 4.5 km below Yolosa, then 10 km W on road up Río Huarinilla (16°12'S, 67°50'W), 1450 m, 19–20 Oct 1982 (fl), *Solomon* 8504 (CAS, MO); Prov. Sud Yungas, 3.8 km W of Huancané on the road to Chuspipata (16°23'S, 67°33'W, 2000 m, 29 Sep 1985 (fl), *Solomon & Nee* 14305 (ASU0007529, MO). **Santa Cruz:** Ángel Sandoval, Prov. Germán Busch, Parque Nacional Otuquis, Estancia Quebracho, en las lajas (19°21'30"S, 58°5'54"W), 140 m, 5 Nov 1998 (fl), *Carrión et al.* 689 (ASU0053024, MO); Prov. Florida, El Fuerte, Samaipata, Pradera sub-montana en la pendiente (18°10'11.4"S, 63°49'2.35"W), 1890 m, 5 Feb 1994 (fl, ft), *Jardim et al.* 342 (ASU0007524); Prov. Velasco, Reserva Ecologica El Refugio, al final de la pista del campamento Refugio sector N Barbecho (14°45'35.8"S; 61°1'58.1"W), 180 m, 27 Apr 1995 (fr), *Guillén & Roca* 3372 (ASU0007526); Prov. Ñulfo de Chávez, Rancho Puesto Nuevo, 40 km S of Concepción (16°25'S, 62°00'W), 1 Mar 1987 (fr), *Killeen* 2359 (ASU0007495); Ichilo, 11 km NE of Buena Vista, 1 km N Buena Vista-Portachuelo highway, on road to Palacios (17°23'S, 63°35'W), 300 m, 8 Dec 1990 (fr), *Nee* 40273 (ASU0007530); Prov. Vallegrande, 5.5 km S of Vallegrande, vic. Santa Rosita, Quebrada Huasacañada (18°32'S, 64°06'W), 2050 m, 31 Dec 1988 (fl, fr), *Nee & Vargas* 37455 (ASU0007533). **Tarija:** Prov. B. O'Connor, Entre Ríos, subiendo de Valle del Medio hacia la divisoria del valle de Chiquiacá (21°39'13"S, 68°07'38"W), 1480 m, 28 Feb 2006 (fr), *Beck et al.* 31843 (ASU0053027); Prov. Arce, camino de Emborozú, prox. a La Mamora (ca. 21.1785°S, 64.6651°W), 1220 m, 13 Mar 1974 (fr), *Turpe et al.* 4774 (LIL).

BRAZIL. Mato Grosso do Sul: Fazenda Agua Amarela, between Boqueirao and Bela Vista (ca. 22.0825° S, 56.5259° W), 27 Sep 1996 (fl), *Ratter et al.* R-7567 (ASU0007475).

PARAGUAY. Alto Paraná: sud du Río Monday (ca. 25.3°S, 55.2°W), 250 m, 12 Sep 1983 (fr), *Stutz* 1897 (ASU0057652). **Amambay:** Parque Nacional Cerro Corá (22°40'S, 55°05'W), 1 Nov 1983 (fl), *Haber* 1772 (ASU0008036). **Caaguazú:** 3 km N of Yhu (25°00'S, 55°55'W), 13 Dec 1982 (yfr), *Hahn et al.* 872 (MO, PY). **Caazapá:** Tavaí, bosque del Dest. militar (26°10'S, 55°20'W), 6 Aug 1989 (fr), *Basualdo* 2675 (FCQ); Estancia Tapyta of Shell Forestry Ltd. (26°15' 11"S, 55°46' 08"W), 15 Dec 1999 (fr), *Zardini & Britez* 53074 (ASU0060387, MO). **Canindeyú:** Ygatimí, Reserva Natural del Bosque Mbaracayú, Valinotti Cue in E side of Reserva (ca. 24°10'S, 55°40'W), 18 Nov 1995 (fl), *Landrum & Basualdo* 8842 (ASU0008038, FCQ). **Concepción:** Arroyo Trementina, 15 km east of Paso Barreto (23°2'39"S, 57°0'41"W), 210 m, 1 Jul 1994 (fl), *Zardini & Leongino* 39917 (ASU0060412, MO). **Cordillera:** 5 km SE of Emboscada on road to Nueva Columbia (25°08'S, 57°15'W), 9 Jun 1990 (fr), *Zardini & Velásquez* 21157 (ASU0008030, MO). **Guaira:** Cordillera de Ybytyruzú, isolated peak 10 km W of Melgarejo (25°45'S, 56°25'W), 16 Oct 1989 (fl), *Zardini & Aguayo* 14951 (ASU0007584). **Itapua:** Capt. Miranda, 4.2 km N of entrance to Hotel Tirol beside and behind CONAVI project (27.151881°S, 55.75973°W), 210 m, 9 Nov 1995 (fl), *Landrum* 8807 (ASU0010503); Capt. Miranda, road to Jesús ca. 0.6 km from main highway from Asunción to Encarnación (ca. 27°12'S, 55°45'W), 185 m, 9 Nov 1995 (fl), *Landrum & Landrum* 8813 (ASU0010502, FCQ); Isla Yacyretí, costa sur (27.42843°S, 56.76038°W), 4 Apr 1994 (fr), *Pin et al.* 587 (PY). **Misiones:** Rt. 1 between San Patricio and Santa Rosa at km A250 (ca. 27°S, 56°45'W), 265 m, 14 Aug 1995 (fr), *Landrum* 8672 (ASU0007541, FCQ); between San Juan Bautista and road San Ignacio-Pilar, Lafuente cué, 20 km SE of San Juan Bautista (26°42'S, 57°16'W), 23 Feb 1994 (fr), *Zardini & Guerrero* 38496 (ASU0060409). **Paraguarí:** Rt. 1, between Quindy and Caapucú, near km 246, ca. 0.5 km N of road to Lago Ypoa (26°S, 57°15'W), 250 m, 7 Nov 1995 (fl), *Landrum* 8773 (ASU0007481); Sapucaí, Cnia. Loma Grande (25°38'14"S, 56°57'49"W), 22 May 2000 (fr), *Mereles & Parini* 7874 (ASU0060437, FCQ); National Park Ybycu'i, 3 km south of northwestern corner of park (26°03'S, 56°46'W), 22 Jun 1991 (fr), *Zardini & Velásquez* 27725 (ASU0060334, MO).

Phenology—Flowering throughout year but mainly from September to November; fruiting throughout year but mainly from January to March.

Habitat and Distribution—Forest, restinga, cerrado, varzea, campo, caatinga, disturbed areas from near sea level to 1650 m. *Psidium guineense* is a widespread species of disturbed habitats, ranging from northern Argentina to Mexico and the Caribbean. It has been widely introduced in subtropical and tropical areas around the world.

Distinguishing Features—Calyx closed or with a small terminal pore in bud, usually tearing into 5 parts; lateral veins 5–10 pairs, usually with a ladder-like pattern of tertiary veins; indumentum of lower leaf surface more or less erect, reddish brown, or more or less appressed, whitish or gray; anthers 1–3 mm long, often with more than 10 glands.

I believe that *Psidium guineense* hybridizes with at least a few other species, namely, *P. guajava*, *P. australe*, and *P. grandifolium*. Some hybrids seem to be locally common. Most of the hybrids tend to be similar in having more or less obovate leaves that are usually densely appressed pubescent below. Thus, it is not always clear what species has crossed with *P. guineense* to produce a hybrid. In *P. guineense* × *P. guajava* the calyx is closed or nearly so in the bud, while in *P. guineense* × *P. australe* the calyx is usually open. Otherwise, these two hybrids can be quite similar. In *P. guineense* × *P. grandifolium* the leaves are often quite large (e.g., *Landrum* 8862, ASU0008015). If one has not seen the hybrids and their parents in the field, it can be difficult to know the parentage of individuals.

Psidium guineense is contrasted with *P. guajava* and *P. grandifolium* in the discussion of those species. One possible intermediate between *P. guineense* and *P. grandifolium* is a population in the area of Parque Nacional Cerro Corá, Amambay, Paraguay that I assign to *P. guineense*. *Landrum* 8675 (ASU0018816) and *Landrum* 8692 (ASU0018815) are good examples. This population should be the subject of additional research.

There are two common morphologies (morphs) found in *Psidium guineense* that seem to intergrade and that often grow together. I contrast them in a key below.

1. Leaves usually oblong-elliptic; lower leaf surface with spreading to erect reddish or yellowish brown hairs; anthers 0.9–2(–3) mm long. Typical morph
- 1' Leaves elliptic to obovate; lower leaf surface with appressed grayish to silvery hairs; anthers 0.8–1.3(–2) mm long. Atypical morph (e.g. type of *Psidium ooidium*).

At least some of these atypical specimens have been hypothesized to be hybrids between *Psidium guineense* and *P. guajava* (Landrum et al. 1995). I now know that the atypical entity is often locally more common than the typical and sometimes the only morph known to occur in a locality. It is possible that the atypical specimens are due to introgression from *P. grandifolium*, *P. guajava*, or *P. australe*. Perhaps additional field studies in conjunction with molecular studies will shed light on this taxonomically difficult situation.

The following are examples of pairs of specimens of typical and atypical morphs of *Psidium guineense* growing near one another:

Argentina, Corrientes, Depto. General Paz: *Landrum* 5676, ASU0004988 (typical) and *Landrum* 5682, ASU0004999 (atypical).

Paraguay, Paraguari: *Landrum* 8773, ASU0007481 (typical) and *Landrum* 8785, ASU0010497 (atypical).

Paraguay, Itapua: *Landrum* 8802, ASU0007538 (typical) and *Landrum* 8807, ASU0010503 (atypical).

Paraguay, Canindeyú: *Landrum* 8866, ASU0007536 (typical) and *Landrum* 8847, ASU0008040 (atypical).

Images of each specimen are available at <http://swbiodiversity.org/seinet/index.php>. Search on collector plus number or herbarium catalog number.

10. *Psidium kennedyanum* Morong, Ann. N. Y. Acad. Sci. 7: 104. 1893. TYPE. Paraguay. Pilcomayo River, *T. Morong* 890 (SYNTYPES: NY-1288056!, NY-1288057!). ISOSYNTYPES: BM-511326, GH-71255, NDG-34691, NY-405565 [exWELC], PH-22410, US-117665).

Psidium paranense O. Berg, in Mart. Fl. bras. 14(1): 604. 1859, an illegitimate later homonym of *Psidium paraense* O. Berg, Fl. Bras. 14(1): 386. 1857. TYPE. Brazil. São Paulo, “Tieté prov. Paranense,” *Riedel* [376] (SYNTYPES: LE-6996, LE-6995 [both annotated by L. R. Landrum but seen as images only]).

Psidium striatulum var. *paranense* O. Berg, in Mart. Fl. bras. 14(1): 603. 1859. TYPE. Brazil. São Paulo, “R. Pardo, Tieté, Parana, florebat Augusto,” *Riedel* [411] (SYNTYPES: LE-7010, LE-7011 [both annotated by L. R. Landrum but seen as images only]).

Psidium striatulum var. *australe* O. Berg, in Martius, Fl. bras. 14(1): 604. 1859. TYPE. Brazil. “prov. Rio Grande do Sul, florebat Julio” *Riedel* [2394] (SYNTYPES: LE-7008 [annotated by L. R. Landrum, but seen as an image only], LE-7009. ISOSYNTYPE: K-565400).

This is an unusual case. First, the specimens are annotated by Berg as “*Psidium striatulum* β *paranense*.” Since he also described a related species as *P. paranense* (= *P. kennedyanum*), did he think at one time that this collection was the same taxon and planned to change *P. paranense* to a varietal status? Before publishing Berg appears to have changed his mind and called the collection *P. striatulum* γ [var.] *australe*, apparently because he thought it came from southern Brazil. The labels say only “Rio grande.” Rio Grande probably refers to a tributary of the Paraná River that now defines the border between São Paulo and Minas Gerais. It is north of the Rio Tieté in São Paulo, where Riedel was a month later. It is unlikely that these specimens truly come from Rio Grande do Sul, Brazil (where the species has not yet been found) as Berg thought.

Guajava paranensis Kuntze, Revis. Gen. Pl. 1: 239. 1891, not *Guajava paraensis* (O. Berg) Kuntze, Revis. Gen. Pl. 1: 239. 1891. Based on the same type as *Psidium paranense* O. Berg, an illegitimate name.

Psidium tripartitum S. Moore, Trans. Linn. Soc. ser. 2, 4: 353. 1895. TYPE. Brazil. Mato Grosso, *S. Moore* 971 (HOLOTYPE: BM-796859; ISOTYPES: K!, NY-1288096!).

Psidium sabulosum Barb. Rodr. ex Chodat & Hassler, Bull. Herb. Boissier 7: 798. 1907, nomen nudum. CITED COLLECTION. Paraguay. “ad ripam fluminis Paraguay,” *Hassler* 7402 (G [= ASU photos], A-71260, BM-511333, MICH-1210418!, MIN-1002846!, MPU-10991, NY-1288087!, P-258379!, S-r-9459, W-19040001086!).

Tree or shrub 1.5–12 m high, glabrous or puberulent on young growth; *hairs* erect, up to ca. 0.3 mm long; *young twigs* thinly puberulent to glabrous, terete or weakly 4-angled, the young bark light tan, falling in strips and flakes, the older bark smooth. LEAVES lanceolate, narrowly lanceolate, less often ovate or elliptic, 2.5–7.5 cm long, 0.8–2.4 cm wide, 1.5–6 times as long as wide; *apex* acute or obtuse; *base* attenuate, rounded, or cuneate; *petiole* 1–7 mm long, 0.5–1 mm wide, usually channeled, glabrous or thinly puberulent; *venation* brochidodromous, the midvein impressed to nearly flat above, prominent below, the lateral veins obscure or evident, raised or flat above and below, 6–10 pairs, extending straight towards margin, connecting with marginal vein near margin, the marginal vein arching slightly between laterals, about equalling them in prominence, mostly up to 1(–2) mm from the margin, the tertiary veins usually obscure, forming an irregular reticulate pattern between the laterals; *blades* submembranous to subcoriaceous, drying olive green to dark reddish brown. FLOWER BUDS pyriform, 8–10 mm long, the hypanthium campanulate, obconic, to narrowly fusiform, 2.5–4.5 mm long, the distal portion of bud subglobose to ovoid, 4.5–7.5 mm long; *indumentum pattern of buds* with all surfaces glabrous or with the peduncles puberulent, or sometimes with bracteoles, rim of the calyx pore, and petals ciliate, the style sometimes puberulent proximally; *peduncles* 1.2–2.5 cm long, 0.5–0.8 mm wide, glabrous or puberulent; *bracteoles* narrowly lanceolate, up to ca. 1.5 mm long, caducous before anthesis. CALYX closed completely or with a small terminal pore, subglobose in the bud, ca. 4–5 mm long, ca. 2 times as wide at the ovary summit, usually tearing in 2 or 3 parts that fall soon after anthesis, the tears not cutting the staminal ring; *petals* elliptic-obovate, 1–1.2 cm long; *hypanthium* obconic to ellipsoid, 2.5–4 long; *disk* 4–6 mm across; *stamens* 230–400, 7–12 mm long; *anthers* oblong, 1.2–1.5 mm long, with a large terminal gland and sometimes with 1–2 smaller glands below; *style* 12–13 mm long, glabrous or puberulent basally; *ovary* 2–3-locular, the locules sometimes puberulent

within; *ovules* 25–72 per locule, ca. 2 seriate on the edge of a peltate placenta. FRUIT globose, to 2.5 cm in diam., the wall 0.7–1.2 mm thick; *seeds* 20–60, flattened, angular, 5–6 mm long. (Fig. 12).

Representative specimens examined. **ARGENTINA.** **Chaco:** vicinity of Barranqueras (ca. 27.482°S, 58.933°W), 35–40 m, Nov–Dec 1913 (fl), *Curran 71* (NY); orillas Río Negro, frente a Fontana (ca. 27.416°S, 59.032°W), 55 m, 12 May 1945 (fr), *Meyer 8599* (NY); Isla del Cerrito (ca. 27.342°S, 58.683°W), 22 Jul 1983 (fr), *Neiff 1577* (CTES); Ayo. Zapiran, Dep. Bermejo (ca. 26.846°S, 58.745°W), 26 Feb 1985 (fl), *Neiff 1670* (CTES); Isla Guascara, Dep. 1 de Mayo, 2 Dec 1980 (fl), *Rumiz 36* (CTES); Riacho Guaycuru y Ruta 11, Dep. 1 de Mayo (ca. 27.347°S, 58.682°W), 27 Jan 1982 (fr), *Rumiz 173* (CTES); 2 km N de Makalle, Dep. Gral. Donovan (ca. 27.208°S, 59.288°W), 19 Feb 1980 (fr), *Schinini 20027* (CTES); Marg. Belén, La Loma (ca. 27.261°S, 58.969°W), 11 Jan 1948 (fl), *Schulz 6848* (CTES); Col. Benítez, ribera Río Tragadero (ca. 27.261°S, 58.969°W), 12 Nov 1959 (fl), *Schulz 10231* (CTES, MICH); Isla Brasilera, 19 Feb 1963 (fl), *Schulz 12110* (CTES); Paranacito (ca. 27.651°S, 58.899°W), 11 Jun 1968 (fr), *Schulz 16291* (CTES). **Corrientes:** 16 km NE de Ituzaingó, costa Río Paraná, 10 Apr 1978 (fr), *Ahumada et al. 2462* (CTES, NY); vicinity of Goya (ca. 29°8'S 59°15'W), 15–30 m, 3 Sep 1913 (fl), *Curran s.n.* (MO); Puerto Luján (ca. 27.366°S, 56.166°W), Dep. Ituzaingó, Jan 1990 (fl), *Heinonen et al 281* (CTES); San Cosme, Isla Toledo (ca. 27.2906°S, 58.4908°W), 10 Apr 1945 (fl), *Huidobro 1920* (NY); General Paz, Itá Ibaté, costa Río Paraná (ca. 27.422°S, 57.321°W), 8 Jan 1946 (fl), *Ibarrola 4022* (MO); San Cosme, Paso de la Patria, 7 Nov 1969 (fl), *Krapovickas & Cristóbal 15587* (CTES, MBM, MICH); Itatí, Dep. Itatí, 23 Jan 1972 (fl, fr), *Krapovickas & Cristóbal 20861* (CTES); Dep. Capital, Quinta “La Eloisa” costa del Río Paraná, 15 Dec 1976 (fl, fr), *Schinini 13846* (CTES, NY). **Formosa:** Est. Agric. Guaycolec, Dep. Formosa (ca. 25.982°S, 58.162°W), 19 Feb 1982 (fl), *Rumiz 220* (CTES). **Misiones:** Posadas (ca. 27.383°S, 55.967°W), 4 Nov 1907 (fl), *Ekman 2045* (NY); Nemesio Parma, Dep. Capital (ca. 27.356°S, 56.017°W), 22 Jul 1993 (fl), *Honfi et al 308* (CTES). **Santa Fe:** altura Los Laureles (ca. 29.368°S, 59.737°W), 23 Dec 1986 (fr), *Blanchoud 2243* (CTES).

BOLIVIA. **Beni:** Prov. Yacuma, Bosque de Chimanes, ca. 20 km SW of San Ignacio, rd. to Herval sawmill (ca. 15°10'S, 64°45'W), 24 Oct 1989 (fl), *Foster 13368* (ASU0015615). **Santa Cruz:** Dep. Chiquitos, Tucavaca, rd. from Santiago de Chiquitos to Santo Corazón (18°10'26"S, 59°26'29"W), 200 m, 30 Jan 1995 (fr), *Abbott 15905* (ASU0008063-photo, FLAS); Dep. Chiquitos Río Tucavaca, 20 km al NE de Santiago de Chiquitos (ca. 18.2125°S, 59.4656°W), 200 m, 22 Oct 1994 (fl), *Foster et al. 3426* (ASU0008065).

PARAGUAY. **Alto Paraná:** Pto. Indio, 9 Jun 1981 (fr), *Caballero Marmori 893* (CTES, MO). **Caazapá:** ruta 6 y Río Tebicuary (56°15'W, 26°40'S), 22 Mar 1993 (fr), *Schinini et al. 27706* (ASU, CTES). **Central:** Tavarory, Avai River near confluence with Paraguay river (25°30'S, 57°30'W), 18 Jun 1991 (fr), *Zardini & Velázquez 27492* (ASU). **Concepción:** Río Nopegue, 30 km desembocadura del Río Paraguay, 1 Aug 1988 (fr), *Mereles 1379* (ASU0052808, FCQ). **Cordillera:** confluence of Río Paraguay and Río Salado (25°09'S, 57°30'W), 23 Dec 1989 (fr), *Zardini & Velázquez 17336* (ASU); Parque Nacional Vapor Cue, Arroyo Yaghuy (25°20'S, 56°40'W), 7 Jul 1990 (fr), *Zardini & Velázquez 21849* (ASU); Río Piribebuy basin, 17 km W of Arroyos y Esteros (25°8'S, 57°18'W), 11 Jan 1991 (fr), *Zardini & Velázquez 25759* (ASU). **Presidente Hayes:** Río Paraguay, 3 km NW of Puente Remanso (25°10'S, 57°34'W), 15 Dec 1995 (fl), *Landrum 8879* (ASU).

Phenology—Flowering mainly from October to February; fruiting mainly from December to March.

Habitat and Distribution—Riparian habitats from northeastern Argentina, Paraguay, Bolivia, and Brazil (Paraná, São Paulo, and Minas Gerais).

Distinguishing Features—Riparian shrub or tree, glabrous or thinly puberulent; leaves 1.5–6 times as long as wide; calyx closed or nearly so; seeds angular, 5–6 mm long.

Psidium kennedyanum is most likely to be confused with *P. striatulum* in our area. The two species are compared directly in lead 18 of the key. It might also be confused with *P. acutangulum*, which is compared to *P. kennedyanum* in the key below.

1. Young twigs 4-angled and slightly winged; young growth usually sparsely strigose, the hairs appressed; petals 10–20 mm long; leaves mainly elliptic, mostly over 2.5 cm wide, 1–3 times as long as wide; fruit usually over 2.5 cm wide, the wall usually 1.5–3 mm thick..... *P. acutangulum*

- 1' Young twigs usually terete to weakly 4-angled; young growth usually sparsely to moderately puberulent, the hairs spreading; petals 10–12 mm long; leaves mainly lanceolate, mostly less than 2 cm wide, 1.5–6 times as long as wide; fruit usually under 2.5 cm wide, the wall usually about 1 mm thick..... *P. kennedyanum*

All specimens known to me come from the Paraná River basin except for *Foster 13368*, cited above, from Yacuma, Beni, Bolivia. The leaves of this collection are not typical for *Psidium kennedyanum* (see Fig. 12B). More collections would be useful in determining if this population might be described as a variety of *P. kennedyanum*.

- 11. *Psidium laruotteanum*** Cambess., in Saint-Hilaire Bras. merid. 2: 282. 1833. TYPE. Brazil. “Prope Alto da Varginha (prov. Minas Geraes),” *Saint-Hilaire s.n.* (HOLOTYPE: P-258429!).

Campomanesia suffruticosa O. Berg, in Mart., Fl. bras. 14(1): 448. 1857. TYPE. Brazil. “v. in hb. Vindob. et Mart.” “in prov. Ceará,” *Gardner 1611* (LECTOTYPE: W-16669! [syntype designated as lectotype by Landrum, 1986]. ISOLECTOTYPES: BR-526717!, F-64891!, K-13353? [no collection number visible, note by Gardner], G-227703!, G-227704!, HAL-89778, K-13354!, NY-386799, P-258522!, P-258524!, SP-112, W-116295!) and *Gardner 1610* (SYNTYPES: W-16668!, W-339892!, W-116293!; ISOSYNTYPES: F-64892? [no collection number visible], G-227705, K-18470!, NY-386800, P-258521!, P-258526!, P-258527!, US-117708!).

Psidium glaucescens O. Berg, in Mart., Fl. bras. 14(1): 600. 1859. TYPE. Brazil. “Serra da Chapada prov. Minarum,” *Riedel [1171]*. (HOLOTYPE: LE-6978; ISOTYPES: F-65695, NY-686161!, P-258462!).

Psidium basanthum O. Berg, in Mart., Fl. bras. 14(1): 601. 1859. TYPE. Brazil. “prope Paracatu et Mugi prov. S. Pauli,” *Riedel s.n.* (HOLOTYPE: LE, = ASU photo).

Guajava laruotteana (Cambess.) Kuntze, Revis. Gen. Pl. 1: 239. 1891.

Guajava glaucescens (O. Berg) Kuntze, Revis. Gen. Pl. 1: 239. 1891.

Guajava basantha (O. Berg) Kuntze, Revis. Gen. Pl. 1: 239. 1891.

Myrtus bergiana Nied., in Engl. and Prantl, Naturl. Pflanzenfam. 3, Abt. 7: 66. 1893. New name for *Campomanesia suffruticosa* O. Berg.

Psidium warmingianum Kiaersk., Enum. Myrt. bras. 28. 1893. New name for *Campomanesia suffruticosa* O. Berg.

Psidium warmingianum var. *verticillata* Kiaersk., Enum. Myrt. bras. 28. 1893. TYPE. Brazil. “Lagoa Santa,” *Lund s.n.* (SYNTYPE: C-10015970) and *Warming s.n.* (SYNTYPES: C-10015969, C-10015971, C-10015972).

Psidium savannarum Donn. Sm., Bot. Gaz.: 244. 1897. TYPE. Costa Rica. “Savana at Buenos Ayres, Comarca de Puntarenas,” *Tonduz CR-4033* (HOLOTYPE: CR [image of “isotype” at <http://ecobiosis.museocostarica.go.cr/especimenes/Buscador.aspx>]; ISOTYPES: BR-526720!, US-117677).

Psidium bergianum (Nied.) Burret, Notizbl. Bot. Gart. Berlin-Dahlem 15: 485. 1941.

Myrtus formosa Barb. Rodr., Myrt. Paraguay 16. 1903. TYPE. Paraguay. “Ipe hu....Sierra Maracayu,” *Hassler 5079* (HOLOTYPE: G!, = ASU photo).

Psidium capibaryense Barb. Rodr. ex Chodat & Hassl., Bull. Herb. Boissier 7: 797. 1907, nomen nudum. CITED COLLECTION. Paraguay. “pr. Vaqueria Capibary,” *Hassler 4387* (two sheets at G!, = ASU photos).

Psidium quinquedentatum Amshoff, Recueil Trav. Bot. Neer. 39: 164. 1942. TYPE. Surinam. “Upper Sipaliwini R. near Brazilian frontier,” *H. E. Rombouts 329* (HOLOTYPE: U-8499; ISOTYPES: MO!, NY-1288079!).

Shrub up to ca. 1.5 m high, often less than 0.5 m high, with new shoots arising from a woody subterranean base or rhizome, densely tomentose to sparsely pubescent over most surfaces; *hairs* to ca. 1.5 mm long, grayish, yellowish white, to rusty, usually curled and tangled; *young twigs* usually densely tomentose, remaining so for more than 1 year, the bark of older twigs becoming rough and scaly. LEAVES normally opposite (rarely in whorls of 3, or spirally arranged) obovate, oblanceolate, elliptic, or oblong, 3–9(–11) cm long, 1.6–4.5(–6) cm wide, 1.6–3.2 times as long as wide; *apex* rounded, acute, or acuminate; *base* obtuse to cuneate; *petiole* 0–2 mm long, ca. 2 mm wide, tomentose; *venation* brochidodromous, the

midvein flat or slightly raised above, prominent below, usually more densely hairy above than surrounding blade, the lateral veins 7–13 pairs, these weak to prominent, slightly raised above in mature leaves, ascending at an angle of ca. 45°, nearly straight, joining an equally prominent, shallowly arching marginal vein that runs 1–2 mm from the margin, the tertiary veins weaker, alternating with the laterals, branching, arising from the marginal vein; *blades* stiffly coriaceous at maturity, drying gray-green to reddish brown (under hairs), the lower surface usually densely tomentose, the upper surface usually sparsely to moderately pubescent. FLOWER BUD obovoid to pyriform, 5–12 mm long, the hypanthium obconic, 2–3.5 mm long, the distal portion of bud subglobose, 3–8.5 mm long; *indumentum pattern of buds* with all external surfaces except petals densely to moderately pubescent or tomentose, the calyx sometimes notably less densely so than the hypanthium, the calyx pubescent within, the petals and style glabrous or essentially so, the disk pubescent or glabrous centrally; *peduncles* 1(–3)-flowered, solitary in the axils of leaves or bracts, 0.2–3 cm long, 1–1.5 mm wide; *bracteoles* linear to narrowly elliptic, 5–8 mm long, 1–1.5 mm wide, caducous at about anthesis. CALYX open, bowl-like, tearing slightly between the lobes, the tubular portion prolonged ca. 1 mm beyond the ovary summit, the lobes mostly broadly triangular, less often narrowly so, 1–4 mm long, 1–3 mm wide; *petals* suborbicular to obovate, 8–10 mm long; *disk* ca. 4 mm across; *stamens* 70–200, 5–9 mm long; *anthers* suborbicular, 0.5–1 mm long, with 1–4 glands; *style* 6–8 mm long; *ovary* (2–)3(–4)-locular; *ovules* 7–19 per locule, reflexed, usually uniseriate on the margin of a peltate placenta. FRUIT subglobose, 1.2–2 cm long; *seeds* 5–20, more or less rounded, 4–7 mm long. (Fig. 13).

Representative specimens examined. **BOLIVIA.** **Santa Cruz:** Prov. Velasco, P. N. Noel Kempff M., Campamento Las Gamas (14°48'52"S, 60°24'08"W), 900 m, 1 Nov 1995 (fr), *Killeen & Grinwood 7819* (ASU0008102); Prov. Chiquitos, Serranía Santiago (18°19'41" S, 59°34'18" W), 650 m, 26 Nov 1999 (fr), *Guillén et al. 4806* (ASU0053023, MO); Prov. Velasco, P. N. Noel Kempff Mercado, 3 km NW del campamento Las Gamas (14°48'11" S, 60°23'34" W), 850 m, 27 Oct 1995 (fr), *Rodriguez & Surubi 506* (ASU0008101, MO).

PARAGUAY. **Canindeyú:** Ygatimí, Reserva Natural del Bosque Mbaracayú, Ñandu Rocai (ca. 24°20'S, 55°40'W), 19 Nov 1995 (st), *Landrum 8860* (ASU0008096, FCQ); Reserva de Campo Comunal del asentamiento Mandu'ará, Compañía Yasy Cañy Curuguaty (24°21'a 24°32'S, 55°52' a 55°03'W), 7 Sep 1996 (fl), *Torres Figueredo 6* (FCQ); Mbaracayú Natural Reserve (24°11'16"S, 55°16'45"W), 15 Jan 1998 (fr), *Zardini & Guerrero 47997* (ASU0060397, MO); Mbaracayú Natural Reserve, Aguará-ñú-Horqueta Mi (24°09'35"S, 55°17'06"W), 24 Sep 1999 (fl), *Zardini & Ramirez Benitez 51392* (ASU0060417, MO).

Phenology—Flowering mainly in September and October; fruiting from November to March.

Habitat and Distribution—Cerrado, campo, at elevations of 550 to 1250 m. Found in Paraguay, Bolivia, Surinam, Brazil (Paraná to Ceará and Mato Grosso), Guyana, Venezuela, Colombia, and Costa Rica.

Distinguishing Features—Shrub to 1.5 m high; calyx open, the lobes triangular or subtriangular, 1–4 mm long; indumentum grayish, yellowish, or reddish brown, usually curled and tangled, obscuring the lower surface of mature leaves; marginal veins present throughout leaf, closely following the margins.

Psidium laruotteanum is variable as to leaf size and shape. Smaller plants, especially new sprouts, tend to have small elliptic leaves and larger plants tend to have larger oblanceolate or obovate leaves. Since a similar pattern is seen throughout the range, I do not suspect a genetic basis for this difference. The species is reported to have medicinal qualities in Paraguay and Costa Rica at least.

- 12. *Psidium missionum*** D. Legrand, Darwiniana 9: 284. 1950. TYPE: Argentina. “Misiones, Depto. Candelaria, Santa Ana,” *Rodriguez 16* (HOLOTYPE: MVM; ISOTYPES: F-76388F!, K-565516, LIL-1030!, SI-3045, SI-3046, SI-3047, SI-3048).

Shrub or subshrub to ca. 1 m high, with a persistent underground stem from which shorter lived above ground shoots arise, resprouting after being burnt or cut to the ground, glabrous to moderately pubescent on young growth and flowers; *hairs* when present whitish, up to ca. 1 mm long but usually shorter; *young twigs* reddish brown, glabrous to pubescent, smooth, the older twigs at first scaly, later smooth, gray. LEAVES oblanceolate, obovate, or elliptic, 2.5–8.8 cm long, 1.1–4 cm wide, 1.8–3.5 times as long as wide; *apex* abruptly acuminate to acute; *base* cuneate to acute; *petiole* 1–2 mm long, 1–1.5 mm thick, flat or channeled above; *venation* eucamptodromous proximally to brochidodromous distally, the midvein flat to slightly impressed above, prominent below, the lateral veins usually 4–6 pairs ascending and arching upwards, connecting to form a weaker marginal vein in the distal half, the smaller tertiary veins between the laterals forming a reticulate pattern; *blades* lustrous or not above, drying olive green, gray-green, to blackish brown, nearly concolorous, coriaceous. FLOWER BUDS pyriform, glabrous (southern localities) to moderately pubescent (northern localities), 6.5–9(–12) mm long, the hypanthium campanulate, 2–3.5 mm long, the distal portion of bud subglobose, 4–6 mm long; *indumentum pattern of buds* with peduncles, bracteoles, hypanthium, calyx and disk glabrous to pubescent, the petals glabrous to subglabrous, sometimes ciliate, the style usually with scattered hairs; *peduncles* 1(–3)-flowered, 1–2.3 cm long, ca. 1 mm wide, flattened; *bracteoles* linear to narrowly lanceolate, 3–8 mm long, ca. 1 mm wide, deciduous at about anthesis. CALYX open in the bud, cup-like, tearing up to ca. 1 mm between the lobes after anthesis, the lobes triangular, 2–4 mm long, 3–4 mm wide, the apex acute to acuminate; *petals* obovate to oblanceolate, ca. 9 mm long; *disk* 4–6 mm across; *stamens* 130–235, 9–11 mm long; *anthers* subglobose to oblong, ca. 0.5–1 mm long, with 3–5 glands; *style* 7–9 mm long, the stigma only slightly wider than style; *ovary* 3–4-locular; *ovules* 43–70 per locule, about 8-seriate, the placenta not peltate, hidden by ovules. FRUIT globose, ca. 1–1.5 cm long; *seeds* 14–20 in fruits seen, ca. 5 mm long, the seed coat several cells thick. (Fig. 14).

Representative specimens examined. ARGENTINA. Misiones: San Ignacio, ca. 3 km along road to Peña Victoria, Teyu Cuaré (ca. 27°15'S, 55°35'W), 10 Dec 1987 (fr), *Landrum 5718* (ASU0008126, CTES); Candelaria, 4 km S of Santa Ana on ruta 12 (ca. 27°25'S, 55°40'W), 11 Dec 1987 (fl), *Landrum 5735* (ASU0008127); San Ignacio, new road to Loreto, ca. 1 km from ruta 12, 11 Dec 1987 (fr), *Landrum 5738* (ASU0008128); Candelaria, 3 km S of Arroyo Yabebiry, 4 km S of San Ignacio on ruta 12 (ca. 27°15'S, 55°35'W), 11 Dec 1987 (st), *Landrum 5740* (ASU0008129, CTES); Cainguás, Monte Carlo, 205 m, 2 Feb 1955 (fr), *Montes 14806* (CAS, NY).

PARAGUAY. Caazapá: Tavaí, destacamento militar (ca. 26°10'S, 55°20'W), 1988 (fl), *Basualdo 2076* (FCQ). **Guairá:** Iturbe, 0.50–0.80 m, 3 Oct 1952 (fl), *Montes 1260* (CTES). **Itapúa:** Trinidad, 19 Dec 1985 (fr), *Basualdo 1030* (CTES, FCQ); Capitán Miranda, 4.2 km N of entrance to Hotel Tirol, behind CONAVI project (27°12'S, 55°45'W), 9 Nov 1995 (fl), *Landrum 8808* (ASU0008123, FCQ); Capitán Miranda, road to Jesús, ca. 0.6 km from main highway (ca. 27°12'S, 55°45'W), 9 Nov 1995 (fl), *Landrum 8812* (ASU0008134, FCQ). **Paraguarí:** road to Lago Ypoa, ca. 23 km N of Caapucú, 3.5 km W of main Asunción-Encarnación highway, ca. 250 m, 10 Nov 1995 (fl), *Landrum 8838* (ASU0008138, FCQ).

Phenology—Flowering mainly from October to December; fruiting December to February.

Habitat and Distribution—Found in campos and cerrado; known only from southern Paraguay and Misiones, Argentina.

Distinguishing Features—Leaves oblanceolate, obovate, or elliptic, 2.5–8.8 cm long, 1.1–4 cm wide, 1.8–3.5 times as long as wide, glabrous to moderately pubescent; *apex* abruptly acuminate to acute; *base* cuneate to acute; without a clear lateral vein in proximal half; calyx lobes about triangular, 2–5 mm long; placenta not peltate; seeds not angular.

Psidium missionum frequently grows with *Psidium salutare* var. *mucronatum* and may be confused with that entity. The two are contrasted in the key below.

1. Leaves 2–4.5 cm long, 0.7–2.3 cm wide, 1.5–5 times as long as wide; marginal vein distinct, closely following the margin; placenta protruding, peltate; style 5–6 mm long, glabrous. ***P. salutare* var. *mucronatum***
- 1' Leaves 2.5–8.8 cm long, 1.1–4 cm wide, 1.8–3.5 times as long as wide; marginal vein evident only in distal portion of leaf, arching broadly between laterals; placenta protruding only slightly, not peltate; style 7–9 mm long, usually with a few scattered hairs. ***P. missionum***

Psidium missionum and *P. grandifolium* are both members of the *P. grandifolium* complex. The variation patterns and the distinction of these species is discussed under the latter species.

13. *Psidium myrsinites* DC., Prodr. 3: 236. 1828. TYPE. Brazil. “desertis prov. Minarum [Rio de S. Francisco]”. *Martius s.n.* (HOLOTYPE: M-146869!).

Psidium myrsinoides O. Berg, in Mart., Fl. bras. 14(1): 384. 1857. TYPE. Brazil. “v. in hb. Vidob. et Berol.” “ad Carmo et Natividade prov. Goyazensis,” *Pohl 1020* (SYNTYPES: B, lost, W-16672, W-16671; ISOSYNTYPES: F-65706, K-565280).

Psidium gardnerianum O. Berg, in Mart., Fl. bras. 14(1): 389. 1857. TYPE. Brazil. Ceará. *Gardner 1610* (SYNTYPES: W-116282!, W-16680; ISOSYNTYPES: BM-796822, F-76384!, G-227710!, GH-71252, K-18450, K-18451, NY-1288049!, OXF, P-258463!, S-R-9451, US117659).

Guajava myrsinites (DC.) Kuntze, Revis. Gen. Pl. 1: 239. 1891.

Guajava myrsinoides (O. Berg) Kuntze, Revis. Gen. Pl. 1: 239. 1891.

Guajava gardneriana (O. Berg) Kuntze, Revis. Gen. Pl. 1: 239. 1891.

Psidium malmei Kausel, Lilloa 33: 108. 1972. TYPE. Brazil. Matto Grosso, Cuyaba. *Malme 1240* (SYNTYPES: S-R-9454, S08-6868).

Tree or shrub 1–5(–9) m high, sparsely to densely pubescent on young growth to subglabrous; *hairs* whitish or tinged with reddish brown, ca. 0.5(–1) mm long; *young twigs* drying gray-green to reddish brown, often pubescent, the first bark with age becoming light gray, cracking, the older twigs rough, scaly, reddish brown to gray. LEAVES oblong, oblong-oblanceolate, obovate, or elliptic, 3.5–13.2 cm long, 1.5–4.6 cm wide, 1.5–4 times as long as wide, subglabrous or the midvein pubescent above, especially at base; *apex* bluntly acute, obtuse, or rounded; *base* rounded, obtuse, or acute; *petiole* essentially none, or ca. 1 mm long and thick, glabrous or pubescent; *venation* brochidodromous to eucamptodromous proximally, the midvein above flat or slightly raised, longitudinally wrinkled, pubescent or glabrous, prominent below, the lateral veins 5–12 pairs, not prominent, leaving the midvein at an angle of 45–60°, the marginal vein not prominent, arching broadly between laterals, running within 0.5–6 mm of the margin, often only evident distally, the tertiary veins forming an intricate dendritic pattern between the laterals; *blades* coriaceous at maturity (subcoriaceous at anthesis), about flat, lustrous above, drying chocolate brown, darker above than below, the margins not revolute. FLOWER BUD 6–9 mm long, pyriform, the hypanthium obconic to infundibular, 2–4.5 mm long, the distal portion of bud subglobose, sometimes wider than long, 3.5–6 mm long; *indumentum pattern of buds* with the peduncles and branches of dichasia usually sparsely to moderately covered with more or less spreading hairs, less often

subglabrous, the hypanthium subglabrous to sparsely pubescent but usually less densely so than peduncle, the calyx densely pubescent within, subglabrous without, the petals pubescent without, glabrous within, the disk sparsely to moderately pubescent, the style often villous proximally; *peduncles* 1(–3)-flowered, solitary in the axils of leaves or bracts, or borne at leafless nodes, 7–45 mm long, ca. 1 mm wide, usually sparsely to moderately covered with more or less erect hairs, sometimes glabrous, longitudinally wrinkled when dry, the bracts narrowly triangular, membranous, up to ca. 5 mm long; *bracteoles* narrowly triangular, 2–3 mm long, caducous before anthesis. CALYX bowl-like, tearing between the lobes ca. 1 mm at anthesis, the lobes broadly rounded, up to ca. 1.5 mm long, ca. 2–3 mm wide, sometimes scarcely detectable before anthesis; *petals* elliptic to obovate, 5–8 mm long; *disk* ca. 5 mm across; *stamens* 160–210, 6–8 mm long; *anthers* 0.5–0.9 mm long, with a terminal gland and 0–5 smaller additional glands; *style* 6–8 mm long; *ovary* 3-locular; *ovules* 17–44 per locule, ca. 2-seriate on each lamella, the placenta slightly peltate. FRUIT subglobose, up to ca. 2 cm in diam.; *seeds* 15–22, 3–5 mm long, with rounded and flat surfaces. (Fig. 15).

Representative specimens examined. BRAZIL. Mato Grosso do Sul: 25 km from Bodoquena on road to Miranda, MS339 (ca. 20°23'S, 56°31'W), 12 Sep 1996 (fl), *Ratter et al.* 7675 (ASU0008160).

BOLIVIA. Santa Cruz: Prov. Chiquitos, above La Mina, zona Matacuzal, Chochís (ca. 18.149838°S, 60.031180°W), 700 m, 18 Nov 2001 (fl), *Wood & Landívar* 17551 (ASU0078686-photo, LPB).

Phenology—Flowering mainly from August to November; fruiting mainly from November to February.

Habitat and Distribution—Cerrado, campo rupestre at elevations of 230 to 1500 m. Found mainly in Brazil from Maranhão to Goiás and Minas Gerais but collected as far north as Roraima and Surinam.

Distinguishing Features—Calyx bowl-like, the lobes broadly rounded; hypanthium subglabrous to sparsely pubescent but usually less densely so than peduncle; marginal vein not prominent, arching broadly between laterals, running within 0.5–6 mm of the margin, often only evident distally; blades drying a chocolate color; petiole to ca. 1 mm long.

Psidium myrsinites can be confused with *P. salutare*, which has a marginal vein that closely parallels the margin and scarcely arches (broadly arching between laterals in *P. myrsinites*).

14. *Psidium nutans* O. Berg, in Mart., Fl. bras. 14(1): 394. 1857. TYPE. Brazil. “in prov. Piauiensi,” *Gardner* 2592 [=2598 on some specimens] (SYNTYPES: W-16673, W-116302!; ISOSYNTYPES: BM-796904, F-76389!, G-227721!, NY-1288066!, P-258405!, US-7838).

Guajava nutans (O. Berg) Kuntze, Revis. Gen. Pl. 1: 239. 1891.

Psidium campicolum Barb. Rodr., Myrt. Paraguay 11. 1903. TYPE. Paraguay. “in regiones fluminis Corrientes,” *Hassler* 4522 (HOLOTYPE: G-194283).

Psidium mattogrossense Barb. Rodr. ex Chodat & Hassl., Bull. Herb. Boissier 7: 799. 1907, nomen nudum. CITED COLLECTION. Paraguay. “pr. Valenzuela,” *Hassler* 7135 (G [two sheets, = ASU photos]).

Psidium verrucosum Barb. Rodr. ex Chodat & Hassl., Bull. Herb. Boissier 7: 799. 1907, nomen nudum. CITED COLLECTION. Paraguay. “pr. Tobaty,” *Hassler* 6384 (G [= ASU photo]).

Psidium popenoei Standley, Ceiba 1: 41. 1950. TYPE. Honduras. Comayagua, Siguatopeque, *Standley & Chacón* 6369 (HOLOTYPE: F-76375!).

Tree or shrub 1–5 m high, glabrous or sparsely appressed antrorsely pubescent on distal inner surface of calyx (rarely puberulent on young growth); *hairs* if present colorless, to ca. 0.5 mm long; *young twigs* reddish brown to blackish brown when dry, smooth with numerous darker glands, the bark of older twigs lighter brown or tan, falling as flakes. LEAVES elliptic

to obovate, 5–17 cm long, 3–12 cm wide, 1.4–2.6 times as long as wide; *apex* acute, acuminate, obtuse to rounded, often with a cuspidate tip; *base* cuneate, obtuse, rounded, oblique, or subcordate; *petiole* shallowly channeled, 3–10 mm long, 1–2.5 mm thick; *venation* eucamptodromous proximally, brochidodromous distally, the midvein impressed proximally to nearly flat above, prominent below, the lateral veins 4–8(–10) pairs, leaving the midvein at an angle of 30–60°, nearly straight near midvein, arching distally towards apex, the marginal vein usually evident distally, arching mostly between 1–3 mm from the margin, the tertiary veins dendritic to ladder-like in pattern; *blades* coriaceous, often lustrous above and below, drying reddish to blackish brown, often mottled above with lighter spots when dry, the margin sometimes crenulate in part. FLOWER BUDS pyriform, moderately to strongly constricted at ovary summit, 7–12(–14) mm long, the hypanthium ellipsoid to campanulate, 3–6 mm long, the distal portion of bud ovoid to subglobose, 4–6.5(–9.5) mm long; *indumentum pattern of buds* with all surfaces glabrous or essentially so; *peduncles* 1–3(–7)-flowered, 0.4–3(–5) cm long, flattened, 1–2 mm wide, the branches of the dichasia 0.4–2 cm long; *bracteoles* narrowly triangular, ca. 2 mm long, caducous at or before anthesis. CALYX closed, or with a small apical pore-like opening, with 5 minute lobes on the margin of the opening, tearing irregularly at anthesis, usually in 4–5 persistent pieces 4–8 mm long, the tears not cutting the staminal ring, glabrous to sparsely pubescent distally within; *petals* elliptic to obovate, 0.8–1.4 cm long; *disk* ca. 3.5 mm across; *stamens* 110–240, 6–10 mm long; *anthers* 1.2–2(–3) mm long, with a few to several glands in the connective; *style* 9–13 mm long, the stigma peltate, 0.5–0.8 mm across; *ovary* 3–5-locular; *ovules* 50–105 per locule, the placenta protruding, sometimes somewhat peltate. FRUIT globose, to subpyriform, 0.7–2 cm long; *seeds* numerous (50 in one fruit), subtriangular with rounded edges, 3–4 mm long. (Fig. 16).

Representative specimens examined. ARGENTINA. **Corrientes:** Ituzaingó, Ea. San Pedro (ca. 27°45'S 56°52'W), 10 Nov 1976 (fl), *Arbo et al. 1505* (CTES); San Cosme, Ensenada Grande, Ruta 1 (ca. 27.3°S, 58.4°W), 6 Oct 1971 (fl), *Krapovickas et al. 20026* (CTES); Berón de Astrada, Campo Yaguá-Cuá (ca. 27.55°S, 57.53°W), 19 Jan 1957 (fl), *Pedersen 4449* (CTES, MO, NY).

BOLIVIA. La Paz: Prov. Iturralde, Luisita, W del Río Beni (13°5'S, 67°15'W), 180 m, 26 Feb 1984 (fl), *Beck & Haase 10046* (ASU0078685-photo). **Santa Cruz:** Prov. Velasco, campamento El Refugio a 7 km al E de la casa (14°44'19"S, 61°0'17"W), 9 Jul 1994 (fl,yfr), *Guillén & Choria 2142* (ASU0008010); Prov. Velasco, Parque Nacional Noel Kempff M., Flor de Oro (13°32'4''S, 61°01'07''W), 18 Nov 1993 (yfr), *Gutierrez et al. 509* (ASU0008004).

BRAZIL. Mato Grosso do Sul: Fazenda Salina, Pantanal do Rio Negro (ca.19°30'S, 56°10'W), 24 Sep 1987 (fl), *Dubs 373* (ASU0008001).

PARAGUAY. Canindeyú: Ygatimí, Reserva Natural del Bosque Mbaracayú, Valinotti Cué (ca. 24°10'S, 55°40'W), 18 Nov 1995(yfl), *Landrum 8841* (FCQ, ASU0008012). **Cordillera:** Piribebuy, Salto Amambay (ca. 25.4713°S, 56.991°W), 720 m, 13 Feb 1991 (fr), *Degen 1791* (NY). **Misiones:** between San Juan Bautista and road San Ignacio-Pilar, Lafuente cué, 20 km SE of San Juan Bautista (ca. 26°42'S, 57°16'W), 23 Feb 1994 (fr), *Zardini & Guerrero 38496* (ASU0060409, MO). **Ñeembucú:** 4 km before entrance to Estancia Redondo (26°36'26''S, 58°3'59''W), 27 Jan 2005 (fl), *Peña-Chocarro et al. 2366* (ASU0060333, BM).

Phenology—Flowering mainly from October to January; fruiting mainly January to February.

Habitat and Distribution—Apparently humid grasslands or riparian habitats at elevations of 150 to 750 m. Found in Pará, Amazonas, Piauí, Bahia and Minas Gerais in Brazil, in Corrientes, Argentina, Paraguay, Bolivia, and Venezuela. Perhaps extending into Central America as well.

Distinguishing Features—Usually glabrous or nearly so; calyx closed, or with a small apical pore-like opening, with 5 minute lobes on the margin of the opening, tearing in 4 or 5 lobes at anthesis; anthers 1.2–2(–3) mm long; tertiary veins dendritic to ladder-like in pattern.

Psidium nutans is quite similar to *P. guineense*, except that it generally lacks abundant indumentum of that species. There seems to be a habitat difference: *P. guineense* usually in drier habitats and *P. nutans* often growing along streams or in wet grasslands. This is a species that requires further study, but it is provisionally accepted here because it seems to be ecologically distinct from *P. guineense*.

15. *Psidium oligospermum* DC., Prodr. 3: 236. 1828. TYPE. Brazil. “prov. Bahiensis,” Martius [2203]. (HOLOTYPE: M-146868! [specimen annotated by de Candolle with description by Martius]; ISOTYPE: M-146867).

Calyptanthus eugenioides Cambess., Fl. Bras. merid. 370. 1833. TYPE. Brazil. Bahia, “prope Bom Jardim...provinciae Minas Geraes,” St. Hilaire s.n. (SYNTYPES: P-801004 [“Type”], P-801005, P-801006[“Isotype”]; ISOSYNTYPE: MPU-10976).

Psidium galapagaeum Hook. f., Trans. Linn. Soc. 20: 224. 1847. TYPE. Ecuador. Galapagos, “James Island” [=Isla Santiago]. [Scouler s.n.] (LECTOTYPE: K-565485 [designated by Porter, 1969]).

Mitranthes eugenioides (Cambess.) O. Berg, Linnaea 27: 317. 1856.

Mitranthes gardneriana O. Berg, in Mart., Fl. bras. 14(1): 354. 1857. TYPE. Brazil. “prov. Alagoas,” Gardner 1311 (HOLOTYPE: W; ISOTYPES: F-65402, F-76367!, K-18789, K-18790, NY-405343, NY-405344, P-258499!, P-258500!, P-258501!).

Mitranthes sartoriana O. Berg, Linnaea 29: 248. 1858. TYPE. Mexico, Vera Cruz, “prope Mirador,” C. Sartorius (HOLOTYPE: location not stated, B? ISOTYPE: G-227668!).

Calycorectes protractus Griseb., Cat. Pl. Cub. 284. 1866. TYPE. Cuba. “Cuba Occ., pr. Hanabana,” Wright [3557]. (HOLOTYPE: GOET; ISOTYPES: GH-68862, K-170083, US-118238!).

Guajava oligosperma (DC.) Kuntze, Revis. Gen. Pl. 1: 239. 1891.

Psidium sartorianum (O. Berg) Niedenzu, in Engler and Prantl, Nat. Pflanzenfam. 3(7): 69. 1893.

Psidium eugenioides (Cambess.) Niedenzu, in Engler and Prantl, Nat. Pflanzenfam. 3(7): 69. 1893. Illegitimate combination. An earlier homonym is *Psidium eugenioides* Cambess.

Calyptanthus tonduzii Donn. Smith, Bot. Gaz. 23: 245. 1897. TYPE. Costa Rica. San José, Río Virilla. Tonduz CR-9822 (HOLOTYPE: CR; ISOTYPES: BM-796882, BR-530471, BR-530438, G-227669!, K-330940, M-137148, MO-187176, NY-386754, US-117854 [annotated as holotype], US-731227!, US-117855).

?*Myrtus paucinerve* Urban, Symb. Ant. 9: 82. 1923. TYPE. Cuba. Prov. Oriente prope Río Piloto, Ekman 2505 (HOLOTYPE: B, lost).

Psidium claraense Urban, Symb. Ant. 9: 466. 1928. TYPE. Cuba. Prov. Santa Clara prope Casilda. Ekman 18887 (HOLOTYPE: B, lost; ISOTYPES: A-71238, G-227690!, NY-1288040!, S-r-8385 [annotated as lectotype by Urquiola, 1997 but apparently never published]).

Psidium microphyllum Britton, Botany of Puerto Rico and the Virgin Islands, 555. 1930. TYPE. Puerto Rico. Mayaguez Experiment Station, July 1930. T. B. McClelland s.n. (HOLOTYPE: NY-1365088!).

Psidium socorrense I. M. Johnst., Proc. Calif. Acad. Sci. 20: 81. 1931. TYPE. Mexico. Revillagigedo Islands, on east slope of Socorro Island. Mason 1639 (HOLOTYPE: CAS-4159; ISOTYPES: GH-71233, K-565290).

Mitropsidium oligospermum (DC.) Burret, Notizbl. Bot. Gart. Berlin-Dahlem 15: 486. 1941.

Mitropsidium eugenioides (Cambess.) Burret, Notizbl. Bot. Gart. Berlin-Dahlem 15: 486. 1941.

Mitropsidium oblanceolatum Burret, Notizbl. Bot. Gart. Berlin-Dahlem 15: 487. 1941. TYPE. Colombia. Santa Marta, H. H. Smith 403 (HOLOTYPE: B, lost; ISOTYPES: CM-1521, F-65406, GH-71039, K-565517!, LL-208130, MICH-1109446, NY-1365084!, NY-1365085!, P-258374!, P-258375!, S-7-8339, S-5-3134, TEX-372173, U-5187, WIS-255103, US-731229!, US-117681).

Mitropsidium pittieri Burret, Notizbl. Bot. Gart. Berlin-Dahlem 15: 488. 1941. TYPE. Venezuela. La Guairita, bei Petare, Miranda, am Wegrund,” H. Pittier 9277 (HOLOTYPE: B, lost; ISOTYPE: NY-405350, VEN!).

Mitropsidium sartorianum (O. Berg) Burret, Notizbl. Bot. Gart. Berlin-Dahlem 15: 487. 1941.

Psidium yucatanense Lundell Contr. Univ. Michigan Herb. 7: 35. 1942. TYPE. Belize. Belize Dist., Belize-Sibun Road. Gentle 9 (HOLOTYPE: MICH-1210419!; ISOTYPES: F-65684, K-565289, NY-1365092!, US-117680!).

Psidium solisii Standley, Field Mus. Nat. Hist., Bot. Ser. 23: 133. 1944. TYPE. Costa Rica. “Hatillo, Finca de J. F. Rojas, 1100 m, 26 Dec 1936,” Solís 509 (HOLOTYPE: F-76376!).

Psidium molinae Amshoff, Acta Bot. Neerland. 5: 277. 1956. TYPE. Honduras. Dept. Morazán: trail from La Quince, El Zamorano, to El Jicarito, 800-900 m, 15 Jul 1949. P. C. Standley 21255. (HOLOTYPE: F-76374!).

THE GENUS *PSIDIUM* (MYRTACEAE) IN BOLIVIA AND PARAGUAY

Psidium sartorianum var. *yucatanense* (Lundell) McVaugh, Fieldiana, Bot. 29: 527. 1963.

Psidium galapageium var. *howellii* D. M. Porter, Ann. Missouri Bot. Gard. 55: 370. 1969. TYPE. Ecuador. Galapagos Islands, Isla San Cristóbal (Chatham Island), 3.5 km above Puerto Bacque, along road to El Progreso, 8 Feb 1967, *Wiggins and Porter 398* (HOLOTYPE: MO; ISOTYPES: CAS-4158, GH-71251, NY-1288048!).

Psidium protractum (Griseb.) Lundell, Wrightia 5(3): 70. 1974.

Tree up to ca. 30 m high, glabrous or sparsely to moderately pubescent on young growth; *hairs* simple, whitish, yellowish or reddish brown, minute or up to ca. 0.2(–0.4) mm long, curly, suberect or antrorse; *young twigs* reddish brown to light yellow-green, glabrous to moderately pubescent, in age becoming glabrescent, gray, smooth, or slightly striate. LEAVES lanceolate to elliptic, 1.6–7.5(–8.3) cm long, 0.4–3.3 cm wide, 1.7–4(–5) times as long as wide, glabrous, or often sparsely pubescent along the margin and midvein above, the margin entire; *apex* sharply or obtusely acuminate, acute, or less often obtuse; *base* rounded, cuneate, acuminate; *petiole* channeled or not, 1–6 mm long, 0.3–1 mm wide, glabrous or pubescent; venation brochidodromous, the midvein about flat or less often slightly impressed proximally above, prominent below, the lateral veins weak, 4–10 pairs, leaving the midvein at an angle of ca. 45°, united near the margin by a broadly arching marginal vein, tertiary veins usually obscure, dendritic, appearing to arise mainly from the marginal vein; *blades* coriaceous to subcoriaceous, drying dark olive-green, reddish brown, or nearly black, often mottled with lighter spots above when dry, or sometimes the whole upper surface grayish. FLOWER BUD pyriform to subfusiform, 3–9 mm long, the hypanthium obconic to campanulate, 1–4 mm long, the distal portion of bud ovoid to subglobose, 2.5–6 mm long; *indumentum pattern of buds* with all external surfaces glabrous to sparsely puberulent or pubescent (rarely moderately so), the hypanthium and calyx often with less indumentum than peduncle, the calyx glabrous to puberulent within, often with an apical tuft of hairs, the petals glabrous or ciliate, or sometimes pubescent if exposed in the bud; disk within the staminal ring usually glabrous, the staminal ring sparsely puberulent, the style glabrous or sparsely puberulent proximally; *peduncles* 6–25 mm long, 0.5–1 mm wide, solitary, uniflorous, or less often triflorous, the branches of the dichasium up to ca. 7 mm long; *bracteoles* narrowly triangular to linear, 1–5 mm long, caducous before anthesis. CALYX completely closed, sometimes with an apiculate apex, or scarcely open with a sinuate margin, or with 4 or 5 short verrucose protuberances at the apical tip, thus appearing puckered at the apex, circumscissile above the staminal disk or tearing in 5 lobes or irregularly at anthesis, persisting briefly as a disk-shaped or conical calyptra or calyx pieces, the remains of the calyx usually falling before the fruit matures, the staminal disk borne on inner surface of the bowl-like calyx tube, the tube tearing as the fruit matures, the calyx (including tube with stamens) sometimes evident only as a circular scar in mature fruits; *petals* suborbicular, 2.5–6 mm long (perhaps sometimes falling with the calyptra); *disk* 1–5 mm across; *stamens* 4–12 mm long, 80–220; *anthers* 0.3–0.5 mm long, with a terminal gland and up to 4 smaller glands below; *style* 4–5 mm long; *ovary* 2–3-locular; *ovules* (4–)10–34 per locule, uniseriate or biseriate on each lamella, the placenta slightly peltate. FRUIT subglobose to pyriform, 5–25 mm long; *seeds* 1–13 per fruit, 3–7 mm long, sublenticular to hemispheric, usually with somewhat angular edges and at least one nearly flat surface. (Fig. 17.)

Representative specimens examined. ARGENTINA. Jujuy: Ledesma, Sierra de Calilegua (23°47'S 64°47'W), 700 m, 10 Sep 1927 (fr), *Venturi 5197* (US).

BOLIVIA. Beni: Prov. Moxos, Concesión Forestal de Monte Grande en la Reserva Forestal Chimanes, parcela permanente de estudio de Río Chocolatón y Chirisi (15°30'S, 66°30'W), 250 m, 8–12 Sept 1991 (st), *Killeen 3463* (ASU0015598). La Paz: Prov. Franz Tamayo, Parque Nacional Madidi, NW de Apolo, senda Azariamas-San Fermín (14°9'26''S, 68°43'23''W), 1093 m, 11 Jun 2006 (st), *Loza et al. 475* (ASU0057548); Prov. Sud Yungas, Alto Beni, Colonia Tauro (ca. 15.8°S, 67.2°W), 495 m, 18 May 1995 (st), *Rodríguez 13*

(ASU0057581). **Santa Cruz:** Prov. Ñuflo de Chávez, 110 km al W de Concepción, 3 km W de Monteverde, camino al Salitral Colorado (15°22'S, 62°22'W), 9 Nov 1992 (fl), *Arroyo et al.* 125 (ASU0015597); Prov. Velasco, Parque Nacional Noel Kempff Mercado, Campamento Huanchaca-2 (14°31'16" S, 60°44'14"W), 700 m, 25 Jun 1996 (fr), *Arroyo et al.* 1281 (ASU0015588); Prov. Velasco, Res. Ecológica El Refugio puesto La Toledo (14°42'18"S, 61°09'37"W), 200 m, 21 Jan 1997 (fr), *Castro et al.* 16 (ASU0015599); Prov. Velasco, Hacienda Acuario a 24 km de San José de Campamento (15°14'46"S, 61°14'34"W), 300 m, 29 Apr 96 (fr), *Guillén et al.* 4 (ASU0015603); Prov. Velasco, San José de Campamento, a 3 km sobre camino hacia San Roque (15°09'20"S, 60°59'29"W), 230 m, 9 May 1996 (fr), *Guillén & Lazo* 4340 (ASU0015601); Prov. Chiquitos, Bocamina, Serranía de Sunsas, Tucavaca, cerca el campamento de Emicruz/RTZ (ca. 18.6°S, 58.917°W), 3 Jul 1995 (st), *Jardín et al.* 2125 (ASU0015594); Prov. Ñuflo de Chávez, Cabañas Selváticas Motacú, a 53 km NW del pueblo de San Javier (15°56'55"S, 62°22' 45"W), 11 Dec 1994 (fl), *Ortiz S.* 81 (ASU0053036); Prov. Ichilo, Buenavista (ca. 16.925°S, 63.628°W), 10 Nov 1924 (fr), *Steinbach* 6675 (K).

BRAZIL. Acre: Mun. Sena Madureira, Rio Purus basin, Rio Macauã, Colocação Cachorra Macho (9°40', 69°02'W), 2 Apr 1994 (yfr), *Daly et al.* 8149 (ASU0014400). **Rondônia:** Mun. Ariquemes, Mineração Mibrasa, Setor Alto Candeias, km 128, SW de Ariquemes (10°35'S, 63°35'W), 19 May 1982 (yfr), *Teixeira et al.* 616 (ASU0014397).

PERU. Madre de Dios: Tambopata, Las Piedras, Cusco Amazónico, Inventario Permanente, trocha B, (12°29'S, 69°3'W), 11 Nov 1991 (fl), *Timaná & Jaramillo* 3117 (ASU0014406).

Phenology—Flowering and fruiting throughout year, probably mainly in spring (early rainy season) months.

Habitat and Distribution—Forests at elevations from 180–1100 m in our area. Found from Mexico to northwest Argentina, Caribbean islands to São Paulo, Brazil; Galapagos and Isla Socorro in eastern Pacific.

Distinguishing Features—Calyx closed or nearly so, if open usually with 4 to 5 minute lobes at the apex, glabrous to puberulent, falling as a calyptra above the stamens or tearing between apical lobes; leaves lanceolate to elliptic; fruit subglobose to pyriform, 5–25 mm long, with a circular terminal scar, with evidence of the staminal ring lost or nearly lost; seeds 1–13 per fruit, 3–7 mm long.

As recognized here *Psidium oligospermum* is a widespread and variable species. Characters that vary are: habit tree versus shrub; flower bud size; presence or absence of dichasia; closure of calyx with or without an apical pore; presence or absence of apical protuberances on the calyx; mode of tearing of calyx; indumentum density and hair size; leaf size, shape, and thickness; fruit size and shape. The most commonly used name has been *P. sartorianum*, but a few other specific epithets have priority as long as a broadly defined species is recognized.

Variations in the calyx (closed or nearly so, falling as a calyptra vs. slightly open with apical protuberances and tearing between apical lobes) have caused taxonomists to recognize more than one taxon in some areas. Examples of this bimodal variation are found in the Galapagos Islands (where the names *P. galapageium* var. *galapageium* and *P. galapageium* var. *howellii* have been used) and in Honduras (where *P. sartorianum* and *P. molinae* have been used).

In Bahia, Brazil a similar situation exists and two usually distinct species are recognized: *P. oligospermum* and *P. schenckianum*. These entities hybridize and the hybrids are often similar to specimens of *P. oligospermum* from other regions. Thus, one potential explanation for the pattern of variation is that *P. oligospermum* originated in the area of Bahia (a region of high diversity in *Psidium*), acquired genes of *P. schenckianum* through hybridization and has carried those genes to other regions. A second hypothesis might be that the ancestor of the *P. oligospermum* complex had enough genetic variability in it that it was able to evolve two

morphologies in multiple areas. In Bahia, these are distinct enough that they are called separate species.

A geographically broad study of *Psidium oligospermum*, including related species such as *P. schenckianum*, *P. glaziovianum*, and *P. appendiculatum*, using molecular techniques, would be valuable. Working in the Atlantic Rainforest of Brazil, Tuler et al. (2015) have found that specimens they identified as *P. oligospermum* and *P. sartorianum* differ in the molecular characters they used. This kind of study should help to better understand this widespread and taxonomically difficult complex.

16. *Psidium salutare* (HBK) O. Berg, Linnaea 27: 356. 1856.

Myrtus salutaris HBK, Nov. gen. sp. 6: 132. 1823. TYPE. Venezuela. “Carichanam, ad ripam Orinoci”, *Humboldt & Bonpland s.n.* (HOLOTYPE: P-679449; ISOTYPE: B [=B1263/11 photo at MICH]).

Subshrub or shrub up to ca. 1.5 m high (often less than 0.5 m high), with new shoots arising from a woody subterranean base or rhizome, with shoots often short lived, or in *Psidium salutare* var. *pohlianum* sometimes reaching tree size (up to 10 m high), glabrous, glabrous except for disk and calyx lobes within, or sparsely to moderately pubescent on young growth, or silvery lanate in one variety; *hairs* when present whitish, 0.3–1 mm long; *young twigs* glabrous to densely pubescent, reddish brown, becoming grayish, the older bark gray to reddish brown, becoming flaky. LEAVES opposite or alternate on some shoots (rarely ternate), ovate, lanceolate, elliptic, narrowly elliptic, obovate, oblanceolate, (1–)2–9 cm long, 0.6–5.5 cm wide, 1.4–5 times as long as wide, drying gray-green to reddish brown, the margin entire to somewhat revolute; *apex* obtuse, acute to acuminate, abruptly acuminate, sometimes apiculate; *base* cuneate, obtuse, or rounded; *petiole* 0–2(–3) mm long, 1–1.5(–2) mm wide; *venation* brochidodromous, the midvein normally flat or slightly raised above, prominent below, the lateral veins 5–12 pairs, prominent to scarcely visible, leaving the midvein at an angle of ca. 45 degrees or less, nearly straight, the marginal veins arching shallowly between laterals, equaling laterals in prominence, running 0.2–2 mm from the margin, the tertiary veins forming a dendritic pattern between the laterals, sometimes appearing to arise from the marginal vein or the midvein; *blades* stiffly coriaceous at maturity, drying reddish brown to gray-green, dull or lustrous above. FLOWER BUDS pyriform, 4–7 mm long, the hypanthium obconic to campanulate, 1–3 mm long, the distal portion subglobose, wider than long, 2.5–4.5 mm long; *indumentum pattern of buds* with all surfaces glabrous, glabrous except for disk and calyx lobes within, or sparsely to moderately pubescent or silvery lanate except for glabrous petals, disk, and style; *peduncles* axillary, uniflorous or triflorous, 0.4–3.5 cm long, 0.5–0.8 mm wide; *bracteoles* linear to lanceolate, deciduous or persisting, 2–9 mm long, 0.5–2 mm wide. CALYX open, bowl-like, tearing ca. 1 mm between the lobes at anthesis, the lobes broadly rounded to ovate-triangular, 0.5–5(–6) mm long, 2–3(–4) mm wide; *petals* obovate to suborbicular, 5–11 mm long; *disk* 3–4(–5) mm across; *stamens* 100–200, 5–12 mm long; *anthers* subglobose to oblong, 0.3–0.8 mm long, with 1–3 glands; *style* 5–8 mm long; *ovary* 2–3-locular; *ovules* 9–48 per locule, uniseriate or biseriate along edge of the placenta, this strongly to scarcely peltate. FRUIT globose to subglobose, 8–10 mm in diam.; *seeds* 4–20, 4–8 mm long, subovoid. (Figs. 18–20).

Distinguishing Features—*Psidium salutare* is differentiated from other species of the genus by: usually being a subshrub or shrub (but reaching tree size in var. *pohlianum*); glabrous or sparsely pubescent except in var. *sericeum*; mainly living in grasslands or low shrubby growth (cerrado) that is frequently burned; an ability to sprout back from underground stems

even after fires; leaves with a well-marked marginal vein that closely follows the margin and tertiary veins that form a reticulate-dendritic pattern; relatively small flower buds (4–7 mm) with the calyx open; and a peltate placenta with one or two rows of ovules on the edge of each lamina. In our area *P. salutare* var. *sericeum* may be confused with *P. laruotteum*; the two entities are compared in lead 5 of the key.

Psidium salutare is a widespread and variable species. I have recognized five varieties in the species (Landrum 2003), four of which occur in our area. Others may consider these entities to be species and have even recognized additional segregates (Soares-Silva & Proença 2006). Legrand and Klein (1977, p. 723) noted difficulty in distinguishing some of these entities but chose to retain them at the specific level. One might speculate that these morphological entities represent adaptive syndromes of characters for somewhat different niches. In-depth studies of these varieties, including population samples, field studies, estimates of genetic distinctness and exchange, and transplant experiments should prove interesting in the future, especially for sympatric varieties (e.g., var. *sericeum* and var. *mucronatum*). As recognized here, there is still considerable variation in var. *salutare* to which specimens unassignable to any of the other varieties are tentatively placed. The four varieties in our area are distinguished in the key below.

1. Young leaves densely covered with hairs beneath, the lower surface of the leaf often hidden; Argentina, Uruguay, Paraguay, Rio Grande do Sul, Santa Catarina, Paraná..... *P. salutare* var. *sericeum*
- 1' Young leaves glabrous to moderately pubescent beneath; distributions various.
 2. Venation clearly evident above and below, the marginal vein within 1 mm of the margin; leaves often narrowly elliptic or lanceolate, often 3 or more times as long as wide, often lustrous; leaf apex often apiculate; calyx-lobes longer than calyx tube; Argentina, Uruguay, Paraguay, Rio Grande do Sul, Santa Catarina, Paraná. *P. salutare* var. *mucronatum*
 - 2' Venation clearly evident or not, the marginal vein usually more than 1 mm from the margin; leaves mostly less than 3 times as long as wide, lustrous or not; leaf apex usually without an apiculum; calyx-lobes longer or shorter than calyx tube.
 3. Leaves 4–9 cm long, 2–5 cm wide, elliptic to obovate; usually shrubs to small trees; plants glabrous; central Brazil, Bolivia to Venezuela..... *Psidium salutare* var. *pohlium*
 - 3' Leaves 3.3–7 cm long, 1–3.3 cm wide, usually lanceolate, ovate, or elliptic; normally subshrubs; plants glabrous or pubescent; Paraguay to Mexico and Caribbean. .. *Psidium salutare* var. *salutare*

16a. *Psidium salutare* var. *salutare*

Psidium salutare (HBK) O. Berg, Linnaea 27: 356, as to type. 1856.

Myrtus arayan HBK, Nov. gen. sp. 6: 133. 1823. TYPE. Ecuador. “prope Gonzanamam Peruvianorum, ad ripam fluminis Catamayo,” *Humboldt & Bonpland s.n.* (HOLOTYPE: P-679197; ISOTYPE: P-258353!).

Psidium ciliatum Benth., J. Bot. (Hooker) 2: 318. 1840. TYPE. Guyana. “dry savannahs,” *Schomburgk s.n.* (HOLOTYPE: K-565505!; ISOTYPES: [*Schomburgk* 365], P-258378!, = ASU photo!, W, = F neg.-31434!).

Eugenia guayavillo Benth., Plantas Hartwegianas, 174. 1845. TYPE. Colombia. “Popayan,” *Hartweg* 977 (HOLOTYPE: K-170068, = ASU photo!).

Psidium guayabita A. Rich., Ess. Fl. Cub. 581. 1846. TYPE. Cuba. “Vuelta de Abajo,” *J. M. Valenzuela s.n.*, (LECTOTYPE: P-87092! [syntype designated as lectotype by Landrum, 2003], = ASU photo!; ISOLECTOTYPE: P-258510!).

Psidium salutare var. *subalternum* O. Berg, Linnaea 27: 357. 1856. TYPE. Guyana. “ad flumen Tacutu,” *Rich. Schomburgk* 498 & 1252; *Rob. S.* 365 (SYNTYPES: B, lost; LECTOTYPE: *Schomburgk* 365, P-258378!; [isosyntype designated as lectotype by Landrum, 2003], = ASU photo!).

Psidium oerstedeum O. Berg, Linnaea 27: 360. 1856. TYPE. Costa Rica & Guatemala. “Provincia Guanacaste” (Oersted) & “Rincón in Guatemala” (Friedrichsthal), *Oersted s.n.* & *Friedrichsthal* 1226 (SYNTYPES: W and “hb. Oersted. no16”; SYNTYPE: C-10015962 [*Oersted* 4004], = ASU photo!).

THE GENUS *PSIDIUM* (MYRTACEAE) IN BOLIVIA AND PARAGUAY

- Psidium salutare* var. *laxum* O. Berg, Linnaea 27: 357. 1856. TYPE. Venezuela. “Orinoco, ad Upata,” *Otto* 987 (HOLOTYPE: B, lost; LECTOTYPE: LE-7005 [isotype designated as lectotype by Landrum, 2003], = ASU photo!; ISOTYPES: MEL-2397977, possible isotype W, = F neg.-31435!).
- Psidium salutare* var. *stricta* O. Berg, Linnaea 27: 356. 1856. Illegitimate name to be replaced by *P. salutare* var. *salutare* because *Myrtus salutaris* HBK is cited as a synonym.
- Myrtus rigida* O. Berg, in Mart., Fl. bras. 14(1): 417 1857. TYPE. Brazil. “ad Paranapitanga distr. Itapeva in prov. S. Pauli,” *Sellow s.n.* (HOLOTYPE: B, lost; LECTOTYPE: P-258328! [isotype designated as lectotype by Landrum, 2003], = ASU photo!).
- Myrtus blanchetiana* O. Berg, in Mart. Fl. bras. 14(1): 418. 1857. TYPE. Brazil. “Bahia,” *Blanchet* 3310 (HOLOTYPE: B, lost; LECTOTYPE: P-258350! [isotype designated as lectotype by Landrum, 2003], = ASU photo!; ISOLECTOTYPES: F-76369f!, G-227665!, P-258351!, P-258505!),
- Myrtus sagraea* O. Berg, Linnaea 30: 710. 1860. TYPE. Cuba. without locality, *De la Sagra s.n.* (HOLOTYPE: P-258327!, = ASU photo!).
- Psidium lanceolatum* O. Berg, Linnaea 30: 704. 1861. TYPE. Brazil. without specific locality, (HOLOTYPE: P-258430!, = ASU photo!).
- Psidium guayabita* var. *oblongatum* Griseb., Cat. Pl. Cub. 91. 1866. TYPE. Cuba. without locality, *Wright* 2436 (HOLOTYPE: GOET; ISOTYPES: MICH!, MO!, NY-1365086!, NY-1365087!, = ASU photo!, P-258509!).
- Psidium guayabita* var. *angustifolium* Griseb., Cat. Pl. Cub. 91. 1866. TYPE. Cuba. without locality, *Wright* 2436a (HOLOTYPE: GOET).
- Calycolpus parviflorus* Sagot, Ann. Sci. Nat. (Paris) VI. 20: 181. 1885. TYPE. French Guiana. without locality, *Leprieur s.n.* (LECTOTYPE: P-258376! [syntype designated as lectotype by Landrum, 2003], = ASU photo!; ISOLECTOTYPE: P-258377!).
- Psidium deltosepalum* Barb. Rodr. ex Chodat & Hassl., Bull. Herb. Boissier 7: 799. 1907, nomen nudum. CITED COLLECTION. Paraguay. “pr. Vaqueria Capibary,” *Hassler* 4400 (G! [3 specimens, = ASU photos!], K-565504, NY-1288044!, P-258470!).
- Psidium valenzuelense* Barb. Rodr. ex Chodat & Hassl., Bull. Herb. Boissier 7: 798. 1907, nomen nudum. CITED COLLECTION. Paraguay. “pr. Valenzuela,” *Hassler* 6947 (G!, 2 specimens, NY-1288097!).
- Psidium arayan* (HBK) Burret, Notizbl. Bot. Gart. Berlin-Dahlem 15: 484. 1941.
- Psidium gentlei* Lundell, Amer. Mid. Nat. 29: 483. 1943. TYPE. Belize. Toledo Dist., “Monkey River, Jenkins Creek,” 1 Aug 1942 (fr), *Gentle* 4062 (HOLOTYPE: MICH-1210412!; ISOTYPES: MO!, LL-372191!, NY-1288050!).
- Myrcianthes reptans* D. Legrand, Bol. Univ. Paraná Fac. Farm. 27: 1–3. 1971. TYPE. Brazil. Paraná, “Mun. Palmeira, Faz. S. Amelia,” *Hatschbach* 17697 (HOLOTYPE: MVM; ISOTYPES: HB!, = ASU photo!, MICH-1210166, UC-1387361, US-288636).
- Psidium reptans* (D. Legrand) Soares-Silva & Proença, Kew Bull. 61(2): 203. 2006.

Usually a subshrub less than 0.5 m high; leaves elliptic, lanceolate, oblanceolate, ovate, or obovate, 3–7 cm long, 1–3.3 cm wide, 1.6–3.2 times as long as wide, glabrous to moderately pubescent; venation obscure to moderately pronounced, the marginal vein usually about 1 mm from margin; apex usually without an apiculum; peduncle 1–5 cm long, uniflorous or triflorous; calyx-lobes shorter or longer than the calyx tube, acute to rounded. (Figs. 18C,D; 20D).

Representative specimens examined. BOLIVIA. Santa Cruz: P. N. Noel Kempff Mercado, Los Fierros (14°36'20"S, 60°51'30"W), 200 m, 26 Oct 1993 (fr), *Killeen et al.* 5943 (ASU0005043); P. N. Noel Kempff Mercado, Los Fierros, pampa La Toledo (13°33'00"S, 60°49'25"W), 250 m, 6 Nov 1993 (fr), *Mostacedo & Menacho* 1207 (ASU0005044); P. N. Noel Kempff Mercado, 6 km NE del campamento Las Gamas (13°53'41"S, 60°48'46"W), 850 m, 28 Oct 1995 (fl), *Rodríguez & Surubí* 549 (ASU0005032).

PARAGUAY. Caaguazú: inter oppidula Caaguazú et Yhú (ca. 25.234°S, 55.973°W), 11 Dec 1982 (fr), *Fernández Casas et al.* 7396 (NY); Ea. La Esmeralda, 11 Dec 1982 (fr), *Schinini* 22902 (CTES, MICH). **Cordillera:** Cabaña María Auxiliadora between Eusebio Ayala and Itacurubi de la Cordillera, km 80 (25°26'06"S, 56°54'38"W), 26 Nov 1997 (fr), *Zardini & Guerrero* 47698 (ASU0304784, MO). **San Pedro:** Yaguarete Forest, Sustainable Forest Systems site (23°48'34"S, 56°06'46"W), 180 m, 30 Oct 1996(yfr), *Zardini & Zavala* 45687 (ASU0060391).

Phenology—Flowering mainly in October and November in our area; fruiting shortly after.

Habitat and Distribution—Found from Paraguay to Mexico and the Caribbean; a shrub or subshrub of open habitats.

Distinguishing Features—See key to varieties.

16b. *Psidium salutare* var. *mucronatum* (Cambess.) Landrum, Sida 20(4): 1463. 2003.

Myrtus lurida Spreng., Syst. Veg. 2: 480. 1825. TYPE. Uruguay. “Monte Video”, *Sello s.n.* (holotype: B?, probably lost).

Myrtus pauciflora Cambess., in Saint-Hilaire, Fl. Bras. merid. 2: 296. 1833. TYPE. “Encapamento do Ricão das galinhas in parte occidentali provinciae Cisplatinae”, *Martius s.n.* (HOLOTYPE: P!, = F-36439!, = ASU photo!).

Myrtus mucronata Cambess., in Saint-Hilaire, Fl. Bras. merid. 2: 295. 1833. TYPE. Saint-Hilaire s.n. “ad ripas fluminum Rio de la Plata et Uruguay in provincia Cisplatina”, *Martius s.n.* (LECTOTYPE: P-258377! [syntype designated as lectotype by Landrum, 2003], = F neg. 36436!; ISOLECTOTYPES: K-565511, MPU-10996, P-258355!, P-258336!).

Myrtus cuspidata O. Berg, in Mart., Fl. bras. 14(1): 415. 1857. TYPE. Uruguay. “in Montevideo,” *Sellow s.n.* (SYNTYPES [the types of two varieties]: B, lost; LECTOTYPE: SGO! [isotype of *Myrtus cuspidata* var. *pentamera*, designated as lectotype by Landrum, 2003], = ASU photo! <http://swbiodiversity.org/seinet/collections/individual/index.php?occid=660531>).

Myrtus cuspidata var. *pentamera* O. Berg, in Mart., Fl. bras. 14(1): 415. 1857. TYPE. Uruguay. “in Montevideo,” *Sellow s.n.* (HOLOTYPE: B, lost; ISOTYPE: SGO!). Illegitimate name to be replaced with *Myrtus cuspidata* var. *cuspidata*.

Myrtus cuspidata var. *tetramera* O. Berg, in Mart., Fl. bras. 14(1): 415. 1857. TYPE. Uruguay. “in Montevideo,” *Sellow s.n.* (HOLOTYPE: B, lost; LECTOTYPE: SGO! [isotype designated by Landrum, 2003], = ASU photo! <http://swbiodiversity.org/seinet/collections/individual/index.php?occid=660532>).

Myrtus mucronata var. *perforata* O. Berg, in Mart., Fl. bras. 14(1): 416. 1857. Illegitimate name to be replaced by *M. mucronata* var. *mucronata* (*Myrtus mucronata* cited as a synonym).

Myrtus mucronata var. *opaca* O. Berg, in Mart., Fl. bras. 14(1): 416. 1857. TYPE. Uruguay. “in Montevideo,” *Sellow s.n.* (HOLOTYPE: B, lost).

Myrtus ovalis O. Berg, in Mart., Fl. bras. 14(1): 417. 1857. Illegitimate later homonym of *Myrtus ovalis* Spreng. TYPE. Uruguay. “in Montevideo,” *Sellow s.n.* (HOLOTYPE: B, lost).

Myrtus suffruticosa O. Berg, in Mart., Fl. bras. 14(1): 418. 1857. TYPE. Uruguay. “in Montevideo,” *Sellow s.n.* (SYNTYPES [the types of two varieties]: B, lost; (LECTOTYPE: P-258323! [isotype of *Myrtus suffruticosa* var. *latifolia*; designated as lectotype by Landrum, 2003]); ISOLECTOTYPES: BR-8489753!, K-565512, W-16662!).

Myrtus suffruticosa var. *latifolia* O. Berg, in Mart., Fl. bras. 14(1): 418. 1857. Illegitimate name to be replaced by *M. suffruticosa* var. *suffruticosa*.

Myrtus suffruticosa var. *angustifolia* O. Berg, in Mart., Fl. bras. 14(1): 419. 1857. TYPE. Uruguay. “in Montevideo,” *Sellow s.n.* (HOLOTYPE: B, lost).

Myrtus acutata O. Berg, in Mart., Fl. bras. 14(1): 415. 1857. TYPE. Uruguay. “in Montevideo,” *Sellow s.n.* (HOLOTYPE: B, lost; LECTOTYPE: P-258355!, = F neg. 36424 [isotype designated as lectotype by Landrum, 2003]; ISOLECTOTYPES: BR-8489708!, P-258354!).

Myrtus sellowiana O. Berg, in Mart., Fl. bras. 14(1): 413. 1857. TYPE. Brazil. “ad Tapanhoacanga prov. Minarum,” *Sellow s.n.* (HOLOTYPE: B, lost; LECTOTYPE: P-258326!, = F-36445 [isotype designated as lectotype by Landrum, 2003]; ISOLECTOTYPE: K-276984).

Psidium thea Griseb., Pl. Lorentz. 91. 1874, and in Abh. Königl. Ges. Wiss. Göttingen 19: 139. 1874. TYPE. Argentina. “Cordoba, in monte Cerro negro pro. San Bartolo,” *Lorentz 377* [Feb 1871] (LECTOTYPE chosen by Landrum (2021b): GOET-7309; ISOLECTOTYPE: CORD-5688) and “Tucuman, in sylvis primaevae,” *Lorentz 63* [May 1872] (SYNTYPE: GOET-7310; ISOSYNTYPE: CORD-5687).

Myrtus mucronata var. *thea* (Griseb.) Griseb., Abh. Königl. Ges. Wiss. Göttingen 24: 127. 1879.

Psidium luridum (Spreng.) Burret, Notizbl. Bot. Gart. Berlin-Dahlem 15: 484. 1941.

Psidium pubifolium Burret, Notizbl. Bot. Gart. Berlin-Dahlem 15: 484. 1941. New name for *Myrtus ovalis* O. Berg.

Psidium luridum var. *cinereum* Mattos, Loefgrenia 64: 2. 1975. TYPE. Brazil. Santa Catarina, “Campo Erê, 17 km W of Campo Erê, ca. 26°22’S, 53°08’W, 900–1000 m,” *Smith & Klein 13807* (HOLOTYPE: HBR, ISOTYPE: R-127745!).

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Psidium pubifolium f. *nanum* Rotman, Darwiniana 20: 433. 1976. TYPE. Brazil. Santa Catarina, “Campo Erê, 37 km W of Campo Erê, ca. 26°22’S, 53°08’W, 900–1000m,” *Smith & Klein 13807* (HOLOTYPE: MVM, ISOTYPE: R-127745!).

Usually a subshrub less than 0.5 m high; leaves mostly narrowly elliptic to lanceolate, (1.5–)2–6 cm long, 0.7–2.3 cm wide, (1.4–)1.5–5 times as long as wide, glabrous to subglabrous, often lustrous; venation pronounced, raised on both surfaces, the marginal vein usually within 1 mm of the margin; apex apiculate; peduncle often over 2 cm long, uniflorous; calyx-lobes usually longer than hypanthial tube plus calyx tube, usually acute. Figs. 18A;20A).

Representative specimens examined. **ARGENTINA. Buenos Aires:** Mar del Plata, Sierra de los Difuntos, Reserva Paititi 37°53'40.5"S 57°50'36.4"W, ca. 220 m, 13 Mar 2021 (fr), *J. L. Méndez* (ASU-photos). **Corrientes:** 2.5 km de la ciudad de Monte Caseros, 28 Dec 1968 (fr), *Carnevali 1317* (CTES); Paso de Los Libres, Bonpland, costa río Uruguay, 19 Jan? 1945 (fr), *Ibarrola 2135* (NY); Santo Tomé, 33 km N de Santo Tomé, 27 Jan 1976 (fl), *Krapovickas & Cristóbal 28934* (CTES, NY); Ituzaingó, Rincón Ombú Chico, 3–5 Jul 1974 (fl), *Krapovickas et al. 25477* (CTES, MICH); Dep. Mercedes, Mercedes a Itá Corá, Ayo. Pay-Ubre, 2 Feb 1974 (fr), *Quarín & Gonzalez 2069* (CTES); Berón de Astrada, 15 km W of Itá Ibaté, Ayo. Santa Isabel, 16 Jan 1977 (fl), *Schinini 14105* (CTES); Estación Experimental INTA, Dep. Empedrado, 7 Dec 1978 (fl), *Schinini 16225* (CTES); Co. Nazareno (Co. de Susini), 15 Feb 1979 (fr), *Schinini et al 17192* (CTES); Santo Tome, Ea. San Lorenzo 4 km N de Galarza (28°04’S, 56°38’W), 30 Mar 2000 (fr), *Tressens et al. 6640* (ASU0015580). **Entre Ríos:** Dep. Federación, Santa Ana, 15 Oct 1968 (fl), *Gomez Sosa 99* (CTES). **Misiones:** Posadas, Bonpland, 11 Jan 1908 (fl), *Ekman 2048* (MICH, NY); Concepción, aldea aborigena Yraka Miri, 15 Sep 2008 (fl), *Keller et al. 6078* (ASU0078679); Candelaria, Bonpland, arroyo Mártires Chico, 16 Jan 1976 (fl), *Krapovickas & Cristóbal 28785* (CTES); Cainguás, Monte Carlo, 205 m, 2 Feb 1955 (fr), *Montes 14806* (NY); Apóstoles, 29 Jan 1948 (fr), *Schulz 6889* (CTES). **Tucumán:** Villa Nongues, Jan 1918 (fr), *Lillo 1351* (MO).

BRAZIL. Paraná: Palmas, Rio Chopim, 7 km abaixo da nascente, 20 Nov 1990 (fl), *Hatschbach 54810* (ASU0015549, MBM). **Rio Grande do Sul:** São Francisco de Paula, (fr), *Rambo 30793* (MICH); Bom Jesus, Fazenda B. Velho, 4 Jan 1947 (fr), *Rambo 35177* (MO, NY).

PARAGUAY. Itapúa: Arroyo Guazú Acatí, 15 Sep 1983 (fl), *Basualdo s.n.* (FCQ); Capitán Miranda, 4.2 km N of entrance to Hotel Tirol (ca. 27°12’S, 55°45’W), ca. 210 m, 9 Aug 1995 (fl), *Landrum 8796* (ASU0015535); Capt. Miranda, road to Jesús, ca. 0.6 km from main highway (27°12’S, 55°45’W), ca. 185 m, 9 Nov 1995 (fl), *Landrum 8814* (ASU0015536). **Paraguarí:** National Park Ybycuí, 6 km S of NE corner of the park (26°04’S, 56°46’W), 25 Nov 1991 (fr), *Zardini & Garcete 29111* (ASU0015538).

URUGUAY. Artigas: ruta 30, 7 km S de Artigas, 10 Dec 1995 (fr), *Solis Neffa et al. 242* (ASU0015534, CTES); Cerro Largo: S of Melo, 4.8 km, 9 Jan 1944 (fr), *Bartlett 21279* (MICH). **Maldonado:** Sierra de Ánimas, ca. 65 km E of Montevideo (ca. 34°45’S, 55°30’W), 22 Nov 1981 (fl), *Landrum 3856* (NY). **Montevideo:** Punta Espinillo, (fl), *Legrand 2710* (MICH); Chapicuy, orillas del río Uruguay, Sta. Sofia, 15 Nov 1942 (fl), *Rosengurtt et al. B-4183* (MO, NY); **Rocha:** Santa Teresa, (fl), *Legrand MVM-1064* (MICH). **San José:** Rincón Gallinas, 5 m, Dec 1931 (fl), *Herter 88052* (NY, RB). **Tacuarembó:** Gruta de los Cuervos, 17 Jan 1944 (fr), *Legrand 3338* (NY).

Phenology—Flowering mainly September to November; fruiting mainly December to March.

Habitat and Distribution—Northern Argentina, Brazil (Paraná to Rio Grande do Sul), Paraguay, and Uruguay; a shrub or subshrub of open habitats that are occasionally burnt.

Distinguishing Features—See key to varieties.

Grisebach (1874) reports that the vernacular name of his *Psidium thea*, a synonym of this variety, is “alpamato” and that it is used as a substitute for tea.

There are many intermediates between typical var. *mucronatum* (which is glabrous) and typical var. *sericeum* (which is densely covered with silvery hairs). The fact that these varieties also have similar distributions, leads me to suspect that there is a simple genetic difference between them. Intermediates have mainly been identified as var. *sericeum*.

Psidium salutare var. *mucronatum* frequently grows with *P. missionum* and can easily be confused with that species. The two are contrasted in the key below.

1. Leaves 2–4.5 cm long, 0.7–2.3 cm wide, 1.5–5 times as long as wide; marginal vein distinct, closely following the margin; placenta protruding, peltate; style 5–6 mm long, glabrous..... *P. salutare* var. *mucronatum*
- 1' Leaves 2.5–8.8 cm long, 1.1–4 cm wide, 1.8–3.5 times as long as wide; marginal vein evident only in distal portion of leaf, arching broadly between laterals; placenta protruding only slightly, not peltate; style 7–9 mm long, usually with a few scattered hairs..... *P. missionum*

If the entity here called *Psidium salutare* var. *mucronatum* is recognized at the specific level, the name *P. luridum* (Spreng.) Burret should be used. There may be no type specimen of *Myrtus lurida* in existence, having been at B and now destroyed. Burret (1941), who studied the type shortly before it was destroyed, listed *Myrtus cuspidata* as a synonym. That coupled with Sprengel's protologue leave little doubt as to its identity. The type of *Myrtus ovalis* O. Berg at B was also destroyed, but the protologue is sufficient to consider it a synonym of this variety.

16c. *Psidium salutare* var. *pohlium* (O. Berg) Landrum, Sida 20(4): 1466. 2003.

Psidium pohlium O. Berg, in Mart., Fl. bras. 14(1): 390. 1857. TYPE. Brazil. "v. fructif. in hb. Vindob., sine fruct. et florib. in hb. Berol," "ad S. Luzia in prov. Goyazensi," *Pohl 913* (SYNTYPE: W-48043; ISOSYNTYPE: F-65713!) and *Sellow s.n.* (SYNTYPES: B, lost, W-48042; ISOSYNTYPE: K-170088, P-258394!, P-258394!). [P-258394 was erroneously designated as a lectotype by Landrum (2003), but a syntype at W could be selected].

Psidium pohlium var. *brevipes* O. Berg, in Mart., Fl. bras. 14(1): 601. 1859. TYPE. Brazil. "prope S. Carlos prov. S. Pauli," *Riedel s.n.* (apparent HOLOTYPE LE-6998 [mixed with other collections]).

Shrub or tree to 10 m high, the trunk bark rough, deeply cracked; leaves mostly elliptic, to obovate, or oblanceolate, 4–9 cm long, 2–5.5 cm wide, 1.4–2.7(–3.5) times as long as wide, glabrous; venation pronounced, raised on both surfaces, the marginal vein usually about 1 mm from the margin; apex usually without an apiculum; peduncle 0.4–2 cm long, often triflorous; calyx lobes shorter or about as long as the calyx tube, rounded to obtuse. (Fig. 19; 20C).

Representative specimens examined. **BOLIVIA. Santa Cruz:** P. N. Noel Kempff Mercado, Pista Las Gamas, (14°48'11"S, 60°23'35"W), 815 m, 9 Nov 1993 (fr), *Guillén & Centurión 1023* (ASU); P. N. Noel Kempff Mercado, 6 km SW del campamento Las Gamas (14°49'36"S, 60°23'10"W), 850 m, 30 Oct 1995 (fr), *Rodriguez & Surubí 592* (ASU); P. N. Noel Kempff Mercado, Huanchaca I, (13°53'55"S, 60°48'46"W), 850 m, 3 Nov 1995 (fr), *Rodriguez & Surubí 630* (ASU).

Phenology—Flowering mainly from September to December; fruiting mainly from January to March.

Habitat and Distribution—Cerrado, campo rupestre, areas subject to burning at 1000 to 1600 m. *Psidium salutare* var. *pohlium* is found in Bolivia, from São Paulo to Ceará and Mato Grosso in Brazil, and also in Venezuela.

Distinguishing Features—See key to varieties. This variety is distinguished from most other Myrtaceae by its rough, deeply cracked, trunk bark.

16d. *Psidium salutare* var. *sericeum* (Cambess.) Landrum, Sida 20(4): 1467. 2003.

Myrtus sericea Cambess., in Saint-Hilaire, Fl. Bras. merid. 2: 295. 1833. TYPE. Uruguay [Brazil]. "Capilha de Mercedes... provinciae Cisplatinae, necnon... Rincao de Saneloés ad ripam amnis Ibicuy in provincia Missionum," *Saint-Hilaire s.n.* (HOLOTYPE: P, = F-36446!; ISOTYPE: P-258325!).

Myrtus nivea O. Berg, in Mart., Fl. bras. 14(1): 414. 1857. TYPE. Uruguay. "ad P[alacio?]° dos Inforcados in Montevideo," *Sellow s.n.* (HOLOTYPE: B, lost; LECTOTYPE: P-258334! [isotype designated as lectotype by Landrum, 2003]; ISOLECTOTYPES: BR-8489760!, W-48023!, = F-31405).

THE GENUS *PSIDIUM* (MYRTACEAE) IN BOLIVIA AND PARAGUAY

- Myrtus sericea* var. *fruticosa* O. Berg, in Mart., Fl. bras. 14(1): 414. 1857. TYPE. Uruguay. “ad Cerro in Montivedeo,” *Sellow s.n.* (HOLOTYPE: B, lost; LECTOTYPE: P-258324! [isotype designated as lectotype by Landrum, 2003]).
- Myrtus sericea* var. *suffruticosa* O. Berg, in Mart., Fl. bras. 14(1): 414. 1857. TYPE. Brazil. Illegitimate name to be replaced by *M. sericea* var. *sericea* because *Myrtus sericea* Cambess. is cited as a synonym.
- Myrtus incana* O. Berg, in Mart., Fl. bras. 14(1): 416. 1857. TYPE. Brazil. “ad Cassapava in Rio Grande do Sul,” *Sellow s.n.* (HOLOTYPE: B, lost; LECTOTYPE: P-258432! [isotype designated as lectotype by Landrum, 2003]; ISOLECTOTYPE: BR-8489746!).
- Myrtus pubescens* O. Berg, in Mart., Fl. bras. 14(1): 415. 1857. Illegitimate later homonym of *Myrtus pubescens* HBK. TYPE. Brazil. “ad Andre’ Ferrina,” *Sellow s.n.* (HOLOTYPE: B, lost; LECTOTYPE: P-258329! [isotype designated lectotype by Landrum, 2003], = F-36441; ISOLECTOTYPE: K-276996).
- Myrtus hassleriana* Barb. Rodr., Myrt. Paraguay 16. 1903. TYPE. Paraguay. “prope Rio Curuguatay,” *Hassler 4609* (HOLOTYPE G, = ASU photo).
- Psidium incanum* (O. Berg) Burret, Notizbl. Bot. Gart. Berlin-Dahlem 15: 485. 1941.
- Psidium niveum* (O. Berg) Herter, Rev. Sudamer. Bot. 7: 221. 1943.
- Psidium tomentellum* Burret, Notizbl. Bot. Gart. Berlin-Dahlem 15: 485. 1941. New name for *Myrtus sericea* Cambess., proposed because of the prior existence of *P. sericeum* O. Berg.

Usually a subshrub less than 0.5 m high; leaves elliptic, ovate, obovate, narrowly elliptic, oblanceolate to lanceolate, 2–7 cm long, 0.6–2.8 cm wide, 2–3.7 times as long as wide, densely covered with silvery gray hairs when young; venation pronounced under hair cover, the marginal vein usually within 1 mm of the margin; apex apiculate; peduncle often over 2 cm long, uniflorous; calyx-lobes usually longer than hypanthial tube plus calyx tube, usually acute. (Fig. 19B; 20B).

Representative specimens examined. ARGENTINA. **Corrientes:** Santo Tomé, ruta 41, 5–6 km al N de Galarza (ca. 28°4’S, 56°39’W), 17 Nov 1994 (fl), *Arbo et al 6402* (CTES); Estancia Ana Cuá, 17 Dec 1970 (fl), *Carnevali 2243* (CTES); Estancia Garruchos, cachuera, Ayo. Chimiray, 6 Feb 1972 (fr), *Krapovickas et al 21174* (CTES); General Paz, Arroyo Sta. Isabel at ruta 12 E of Itá Ibaté (ca. 57°30’W, 27°20’S), 9 Dec 1987 (fr), *Landrum 5701* (ASU, CTES); Dep. Paso de los Libres, Estancia El Recreo, 21 km E Bonpland, costa río Uruguay, 18 Nov 1973 (fl), *Lourteig et al 2737* (CTES); Monte Caseros, 19 Feb 1975 (fr), *Prause s.n.* (CTES); Empedrado, Estación Experimental INTA, 7 Dec 1978 (fl), *Schinini 16188* (CTES); 10 km S de Bella Vista, 8 Nov 1978 (fl), *Schinini & Ahumada 15894* (CTES, MO); 11 km S de Mercedes, antiguo camino a Curuzú Cuatiá, Co. Pajarito, 23 Feb 1984 (fr), *Tressens et al 2420* (CTES). **Entre Ríos:** Concordia, Dec 1946 (fl), *Meyer 11007* (LIL). **Misiones:** Posadas, Lareto, Casa de Drewes, 26 Jan 1908 (fr), *Ekman 2056* (MICH, NY); San José, Feb 1961 (st), *Martinez Crovetto 8D-1* (CTES). **Tucumán:** Burruyacú, Cerro del Campo, 1000 m, Nov 1978 (fl), *Venturi 7582* (F).

BOLIVIA. **Santa Cruz:** Prov. Florida, 4 km N of center of Samaipata (18°08’S, 63°52’W), 2000–2100 m, 31 Dec 1992 (fr), *Nee & Vargas 43465* (ASU).

BRAZIL. **Rio Grande do Sul:** Continuação da estrada Alegrete-Cerro do Tigre, apos o Cerro do Tigre, direção rio Ibicuí, 11 Feb 1990 (fr), *Falkenberg & Sobral 15235* (MBM); Pôrto Alegre, Montserrat, 13 Nov 1941 (fl), *Emrich 8380* (LIL); Fazenda Faxinal, Arroio dos Ratos, 5 Nov 1980 (fl), *Hagelund 13420* (CTES, NY); Morro das Abertas, 9 Jan 1949 (fl), *Rambo 39674* (LIL); São Vicente do Sul, estrada a Cacequi, rio Ibicuí, Dec 1985 (st), *Sobral & Marchiori 4544* (UB).

PARAGUAY. **Central:** Itá, Granja Isapy, orilla arroyo Lazarillo, 30 Jan 1966 (fr), *Krapovickas et al 12231* (CTES). **Cordillera:** Ypacaraí, 6 Dec 1950 (fr), *Sparre & Vervoost 814* (LIL). **Misiones:** San Juan Bautista, ca. 8.5 km along road to Pilar, ca. 170 m, 8 Nov 1995 (fr), *Landrum 8790* (ASU); Ea. La Soledad, 3 km S de Santiago (56°46’W, 27°10’S), 3–4 Feb 1988 (fr), *Schinini & Vanni 26108* (ASU, CTES). **Paraguarí:** Rt. 1, between Quindy and Caapucú, near km 246 (26°S, 57°15’W), ca. 250 m, 7 Nov 1995 (st), *Landrum 8764* (ASU).

URUGUAY. **Cerro Largo:** Arroyo Zapallar, 22 Dec 1961 (fr), *Praderi 740* (LIL). **Durazno:** Est. Las Palmas, Mar 1922 (st), *Osten 16563* (NY). **Montevideo:** La Colorada, 17 Nov 1947 (fl), *Legrand 2711* (NY). **Paysandú:** Chapicuy, orillas del río Uruguay, Sta. Sofia, 15 Nov 1942 (fl), *Rosengurt B-3250* (MO, NY). **Rivera:** Tranqueras, (fl), *Legrand 4145* (MICH, NY). **San José:** Rincón Gallinas, Dec 1931 (fl), *Herter 8051* (MO). **Tacuarembó:** Cerro Dos Hermanos, Mar 1922 (fr), *Osten 16651* (NY).

Phenology—Flowering mainly in November and December; fruiting from December to February.

Habitat and Distribution—Open habitats such as “campos” and grasslands, that are occasionally burned; Argentina and Uruguay to southeastern Brazil, Paraguay and Bolivia.

Distinguishing Features—See key to varieties.

This entity has long gone by the name *Psidium incanum* (O. Berg) Burret, which is the correct name if one recognizes it at the specific level. It most closely resembles var. *mucronatum* and intergrades with it. It also resembles southern morph 3 of *P. grandifolium*. The two are distinguished in lead 4 of the key.

17. *Psidium striatulum* DC., Prodr. 3: 233. 1828. TYPE. Brazil. *Martius s.n.* (HOLOTYPE: M-32386, annotated by de Candolle).

Shrub or small tree 1–6 m high, the young growth densely to sparsely hirsutulous-pubescent; *hairs* 0.1–0.6 mm long, on external surfaces soft, whitish, usually spreading to erect, on inner surfaces of calyx and disk reddish brown, appressed; *young twigs* moderately to densely covered with spreading hairs or rarely glabrous, soon glabrescent, the young bark reddish brown to light gray, becoming dark reddish brown or dark gray, remaining smooth or becoming longitudinally striate or cracked or slightly flaky in age. LEAVES elliptic, ovate, or oblong-lanceolate, usually widest at the middle or below, 2.2–7(–12) cm long, 1.5–3(–5) cm wide, 1.5–3 times as long as wide, glabrous or with scattered hairs, or sparsely to densely pubescent along the midvein, the margin usually obscurely sinuate-crenulate; *apex* acute, acuminate, less often rounded-obtuse (rarely emarginate), often apiculate; *base* rounded, subcordate, or obtuse; *petiole* pubescent or glabrous, channeled, 1–3 mm long, 0.8–1.5 mm thick; *venation* brochidodromous, sometimes eucamptodromous proximally, the midvein impressed above, prominent below, the lateral veins 4–10 pairs, leaving the midvein at an angle of 45° to nearly 90°, the marginal vein broadly arching between the laterals, as much as 7 mm from margin between arches, the tertiary veins obscure or pronounced, irregularly dendritic; *blades* submembranous to subcoriaceous, drying gray-green to dark reddish brown, slightly lighter below than above, lustrous to dull above, usually densely dotted with glands. FLOWER BUDS 8–14 mm long, pyriform, the hypanthium campanulate, narrowly campanulate or fusiform, 3–5 mm long, the distal portion of bud subglobose to barrel-shaped, sometimes wider than long, 5–9.5 mm long; *indumentum pattern of buds* with peduncles moderately to thinly pubescent with spreading hairs, or glabrous, the bracteoles pubescent, the hypanthium pubescent to glabrous, the calyx puberulent within, pubescent to glabrous without, the petals glabrous or ciliate, the disk puberulent, the style glabrous; *peduncles* uniflorous (rarely 3-flowered), solitary, borne in the axils of leaves, usually terete, 0.9–2.3 cm long, 0.8–1 mm wide, thicker and somewhat woody at fruit maturation, usually puberulent with erect hairs; *bracteoles* narrowly triangular to filiform, ca. 1–2 mm long, caducous before bud matures. CALYX bowl-like, closed except for an apical pore nearly as wide as closed corolla, or completely closed, with no clear lobes evident before anthesis, extending 3–6(–8) mm beyond the ovary summit, densely glandular, at anthesis tearing somewhat irregularly or in 5 nearly equal lobes, the tears not cutting the staminal ring; *petals* obovate, 10–15 mm long; *hypanthium* densely glandular; *disk* ca. 4–5 mm across; *stamens* ca. 200–300, 8–15 mm long; *anthers* ca. 0.7–1 mm long, oblong, with a terminal gland and 0–2 smaller glands below, or 3–4 mm long, attenuate, with a terminal gland and up to at least 5 smaller glands below; *style* 10–15 mm long, the stigma peltate, 0.5–1 mm wide; *ovary* 3-locular, the placenta not peltate; *ovules* ca.

30–60 per locule, about 4-seriate (2-seriate on each lamella). FRUIT globose, 1–1.5 cm long, brown to green, sometimes tinted red; *seeds* ca. 80 in 1 fruit, probably often more, compressed, angular, C to L-shaped, ca. 4–5 mm long. (Figs. 21; 22).

Phenology—Flowering and fruiting throughout year; mainly flowering in November in Bolivia.

Habitat and Distribution—Along rivers or on islands in rivers, in sandy or rocky places; reported also from a white sand savanna. Found from Venezuela, the Guianas, Roraima to Mato Grosso do Sul in Brazil, and Bolivia.

Distinguishing Features—Calyx bowl-like, closed except for an apical pore, or completely closed, with no clear lobes evident before anthesis, extending 3–6(–8) mm beyond the ovary summit, at anthesis tearing somewhat irregularly or in 5 nearly equal lobes, the tears not cutting the staminal ring; peduncle usually terete, 0.8–1 mm wide, thicker and somewhat woody at fruit maturation, usually puberulent with erect hairs; seeds angular.

Psidium striatulum has not been found in Paraguay. The population in northeastern Bolivia I recognize as var. *rondoniense* because of its unusual stamens. A specimen of *P. striatulum* var. *striatulum* with typical stamens has been collected in Mato Grosso, Brazil about 100 km east of southeastern Bolivia and northeastern Paraguay and possibly might be found in either country. A key distinguishing the varieties is provided below.

1. Stamens with filaments ca. 10 times as long as anthers; anthers oblong, 1–1.5 mm long..... *P. striatulum* var. *striatulum*
- 1' Stamens with filaments 1.5–3 times as long as anthers; anthers elongate, narrowly sagittate, 2–3.5 mm long... *P. striatulum* var. *rondoniense*

17a. *Psidium striatulum* var. *striatulum*

Psidium striatulum DC., Prodr. 3: 233, as to type, 1828.

Psidium turbiniflorum DC., Prodr. 3: 234. 1828. TYPE. Brazil. “in Brasilia,” *Martius s.n.* (HOLOTYPE: M-32388, annotated by de Candolle. Possible ISOTYPES: from Ega on Rio Negro, M-32387, M-146858!).

Psidium aquaticum Benth., J. Bot. (Hooker) 2: 318. 1840. TYPE. Guyana. *Schomburgk 191* (HOLOTYPE: K-565506; ISOTYPES: BM-796830, BR-5281459!, E-167679, F-76381!, F-76382!, MICH-1210416, P-2428283, US-117654, W-46098!).

Psidium parviflorum Benth., J. Bot. (Hooker) 2: 318. 1840. TYPE. Guyana. “on the Essequibo and Rupunoony,” *Schomburgk 110* (SYNTYPES: K-565174 [annotated as isotype], K-565402; ISOSYNTYPES: BM-796861, E-167680, F-65709, P-258400!, P-258401!, TCD-4963, US-117671, W-48041).

Psidium aquaticum var. *uniflorum* O. Berg, Linnaea 27: 354. 1856. Illegitimate name to be replaced by the autonym *Psidium aquaticum* var. *aquaticum* because Berg cites *P. aquaticum* under that variety.

Psidium aquaticum var. *triflorum* O. Berg, Linnaea 27: 355. 1856. TYPE. Guyana [“Guiana Anglica”]. *Rich. Schomburg 539* (HOLOTYPE: B, lost).

Psidium leptocladum O. Berg, in Mart., Fl. bras. 14(1): 409. 1857. TYPE. Brazil. “ad flumen Rio Maranhao in prov. Goyazensi,” *Pohl 1018* (SYNTYPES: W-16678, W-16679).

Psidium persicifolium O. Berg, in Mart., Fl. bras. 14(1): 407. 1857. TYPE. Brazil. “in montibus Serra d’Acurua prov. Bahiensis, [11.5S, 42.5W]” “v. in hb. Berol., Mart., Vindob,” *Blanchet 2916* (SYNTYPES: BR-528154!, W-16676, W-18890124691; ISOSYNTYPES: BM-796800, E-167674, F-65711, G-227672!, HAL-89787, K-18468, LE-6997, MICH-1210427!, P-258398!, P-258397!, P-258399!).

Guajava [s]triatula (DC.) Kuntze, Revis. Gen. Pl. 1: 239. 1891.

Guajava parviflora (Benth.) Kuntze, Revis. Gen. Pl. 1: 240. 1891.

Guajava persicifolia (O. Berg) Kuntze, Revis. Gen. Pl. 1: 239. 1891.

Guajava turbiniflora (DC.) Kuntze, Revis. Gen. Pl. 1: 239. 1891.

Myrtus striatula (DC.) O. Kuntze, Revis. Gen. Pl. 3(3): 92. 1898.

Psidium parviflorum var. *saramaccense* Amshoff, Bull. Torr. Bot. Club 75: 537. 1948. TYPE. Surinam. “Saramacca River,” *Maguire* 24930 (HOLOTYPE: NY-1288075!; ISOTYPES: F-76391!, K-565403, U-5190, US-117672).

Psidium parviflorum var. *coppenamense* Amshoff, Fl. Suriname 3, pt. 2: 153. 1951. TYPE. Surinam. “Coppename R,” *Boon* 1083 (SYNTYPE: U?), “Raleighfalls” *Stahel* 4654 (SYNTYPE: U?) and “Raleighfalls” *Lanjouw* 997 (SYNTYPES: U-5188, U-5189; ISOSYNTYPES: K-565418, NY-1288072!).

Leaves lustrous above or not, the base obtuse to subcordate; stamens with filaments ca. 10 times as long as the anthers; anthers oblong, 1–1.5 mm long.

Representative specimen examined. BRAZIL. Mato Grosso: Fazenda Barranco, Pantanal do Rio Negro (19°30’S, 56°10’W), 26 May 1989 (fl), *Dubs* 981 (ASU0015614).

17b. *Psidium striatulum* var. *rondoniense* Landrum, J. Bot. Res. Inst. Texas 15(2): 540. 2021. TYPE. Brazil. Rondônia: Mineração Campo Novo, ca. 100 km SW of Ariquemes, forest on terra firma, 10°34’S, 63°37’W, 16 Oct 1979 (fl), *J. L. Zarucchi, M. G. Viera, R. H. Petersen, C. D. Mota, & J. F. Ramos* 2722 (HOLOTYPE: INPA (seen as image); ISOTYPES: MICH!, NY!, R!, US!).

Leaves often lustrous above, the base usually subcordate; stamens with filaments 1.5–3 times as long as the anthers; anthers elongate, narrowly sagittate, 2–3.5 mm long.

Representative specimens examined. BOLIVIA. Beni: Prov. Yacuma, Bosque de Chimanes, ca. 20 km SW of San Ignacio, road to Herval sawmill (ca. 15°10’S, 65°45’W), 250 m, 24 Oct 1989 (fl), *Foster & Terceros* 13368 (F). Santa Cruz: Prov. Velasco, a 150 km de Florida a Bella Vista, (13°42’10”S, 61°31’59”W), 4 Nov 1994 (fl), *Guillén et al.* 2541 (ASU0015611); P. N. Noel Kempff M., Las Torres (13°39’20”S, 60°49’08”W), 200 m, 29 Nov 1994 (fl), *Jardim & Quevedo* 189 (ASU0015619); P. N. Noel Kempff M., Campamento Flor de Oro (13°38’24”S, 60°47’45”W), 200 m, 22 Nov 1993 (fr), *Quevedo et al.* 2533 (ASU0015620).

18. *Psidium suffruticosum* Berg, in Martius, Fl. bras. 14(1): 387. 1857. TYPE. Brazil. “in pascuis desertorum Brasiliae,” *Pohl* 1021 (original material cited at B, M, W; LECTOTYPE: W-0046104! [isotype designated as lectotype by Landrum, 2005]; ISOLECTOTYPES: M-146859!, = F neg 19727, BR-5267231!, K-565293, K-565294).

Psidium alatum O. Berg, in Mart., Fl. Bras. 14(1): 604. 1859. TYPE. Brazil. “Serra da Chapada prov. Minarum,” *Riedel s.n.* (HOLOTYPE: LE-6973, = ASU photo).

Psidium suffruticosum var. *alata* Kiaersk., Enum. Myrt. bras. 27. 1893. TYPE. Brazil. “Lagoa Santa,” “São Simão,” *Warming s.n.* (SYNTYPE: C) and *Lofgren* 212 (SYNTYPE: C; ISOSYNTYPE: SP!, = photo specimen ASU0116498) and *Glaziou* 16972 (SYNTYPE: C; ISOSYNTYPE: R-8952!, = ASU photo).

Guajava suffruticosa (O. Berg) Kuntze, Revis. Gen. Pl. 1: 239. 1891.

Psidium australe var. *suffruticosum* (O. Berg) Landrum, SIDA 21(3): 1344. 2005.

Shrub up to ca. 30 cm high, sprouting from a fire-resistant underground stem, glabrous or essentially so except for puberulent inner calyx-lobe surface and young growth, the surfaces often with numerous raised glands; *hairs* minute, whitish; *young twigs* 4-angled, gray-green, becoming darker gray to light brown with age, the bark of older stems becoming flaky, reddish brown. LEAVES oblanceolate, obovate, narrowly elliptic, 5–9 cm long, 1.3–4.6 cm wide, 1.6–5.6 times as long as wide; *apex* acute, acuminate or rounded, often with an abruptly acuminate tip; *base* cuneate to acute; *petiole* essentially none to ca. 2 mm long, 2–1.5 mm wide, usually channeled; *venation* eucamptodromous proximally to brochidromous distally, the midvein flat to slightly impressed above, prominent below, the lateral veins 5–8, ascending at an angle of less than 45 degrees, raised above and below, the marginal vein only evident distally, up to 3(–6) mm from the margin, the tertiary veins branching dendritically, often more prominent

above than below; *blades* coriaceous, lustrous above, drying gray-green, dark olive green, to dark reddish brown above, usually lighter below. FLOWER BUDS pyriform, 5–8 mm long, the hypanthium campanulate to infundibular, 2–3.5 mm long, the distal portion of bud subglobose, 3–5 mm long, sometimes wider than long; *indumentum pattern of buds* with all surfaces glabrous except for the puberulent inner surface of the calyx; *peduncles* 1–3-flowered, (2–)10–37 mm long, 0.8–1.5 mm wide, the arms of the dichasia 2–13 mm long; *bracteoles* narrowly deltoid-lanceolate, 2–3 mm long, usually falling before anthesis. CALYX in young bud closed except for an apical pore surrounded by 5 minute lobes, tearing more or less regularly between at least some lobes at anthesis for about 1/2 of bud's length to staminal ring; *petals* suborbicular to obovate, ca. 9 mm long; *disk* ca. 5–10 mm across; *stamens* 6–9 mm long, 140–300; *anthers* 0.5–1 mm long, with a single gland; *style* ca. 8 mm long; *ovary* 3–4-locular; *ovules* 20–47, the placenta not peltate, hidden by the ovules. FRUIT subglobose, 1–2 cm in diameter; *seeds* 6–11 per fruit, 3–5 mm long. (Fig. 23).

Representative specimens examined. **BOLIVIA. Santa Cruz:** Prov. Velasco, Parque Nacional Noel Kempff Mercado (13°53'41"S, 60°48'46"W), 500 m, 28 Jan 1997 (fl), *Soto et al.* 424 (ASU0005422); José Miguel de Velasco, Ñuflo de Chávez, 15 km por el camino de Santa Rosa a Piso Firme (15.8117°S, 61.4846°W), 358 m, 14 Nov 2008 (fr), *Wood & Soto* 25359 (ASU0078689-photo).

BRAZIL. Mato Grosso. 13°50'S, 60°08'W, 29 Nov 1977 (fr), *Silva Costa* 1300 (ASU0005423).

PARAGUAY. Amambay: Sierra de Amambay (ca. 23°S, 56°W), 1912–1913 (fl), *Hassler* 11401 (ASU0005421-photo, NY); **Canindeyú:** Ygatimi', Res. Natural del Bosque Mbaracayú, Ñandu Rocai (ca. 24°10'S, 55°40'W), 19 Nov 1995 (fl), *Landrum* 8857 (ASU0005424).

Phenology—Flowering mainly in October and November; fruiting from November to May.

Habitat and Distribution—Campos, cerrado, grasslands, frequently burnt areas; Mato Grosso, Minas Gerais, and São Paulo in Brazil; Bolivia and Paraguay.

Distinguishing Features—Calyx of flower bud nearly closed in young flower bud, tears forming between lobes as flower bud opens; leaves often 3 or more times as long as wide, lustrous above, glabrous or nearly so below; peduncles usually more than 2 cm long, usually 3-flowered; seeds up to ca. 11; placenta not peltate, hidden by ovules.

I have previously recognized this entity as a variety of *Psidium australe*, to which it seems to be closely related and with which it may hybridize (e.g., *Souza et al.* 7135, ASU0005418). They are compared in lead 11 of the key.

Excluded species

Psidium rufigerum Barb. Rodr., Myrt. Paraguay 15. 1903. TYPE. Paraguay. "Sierra de Maracayú" *Hassler* 5232 (HOLOTYPE: G-72801!) = *Campomanesia pubescens* (DC.) O. Berg.

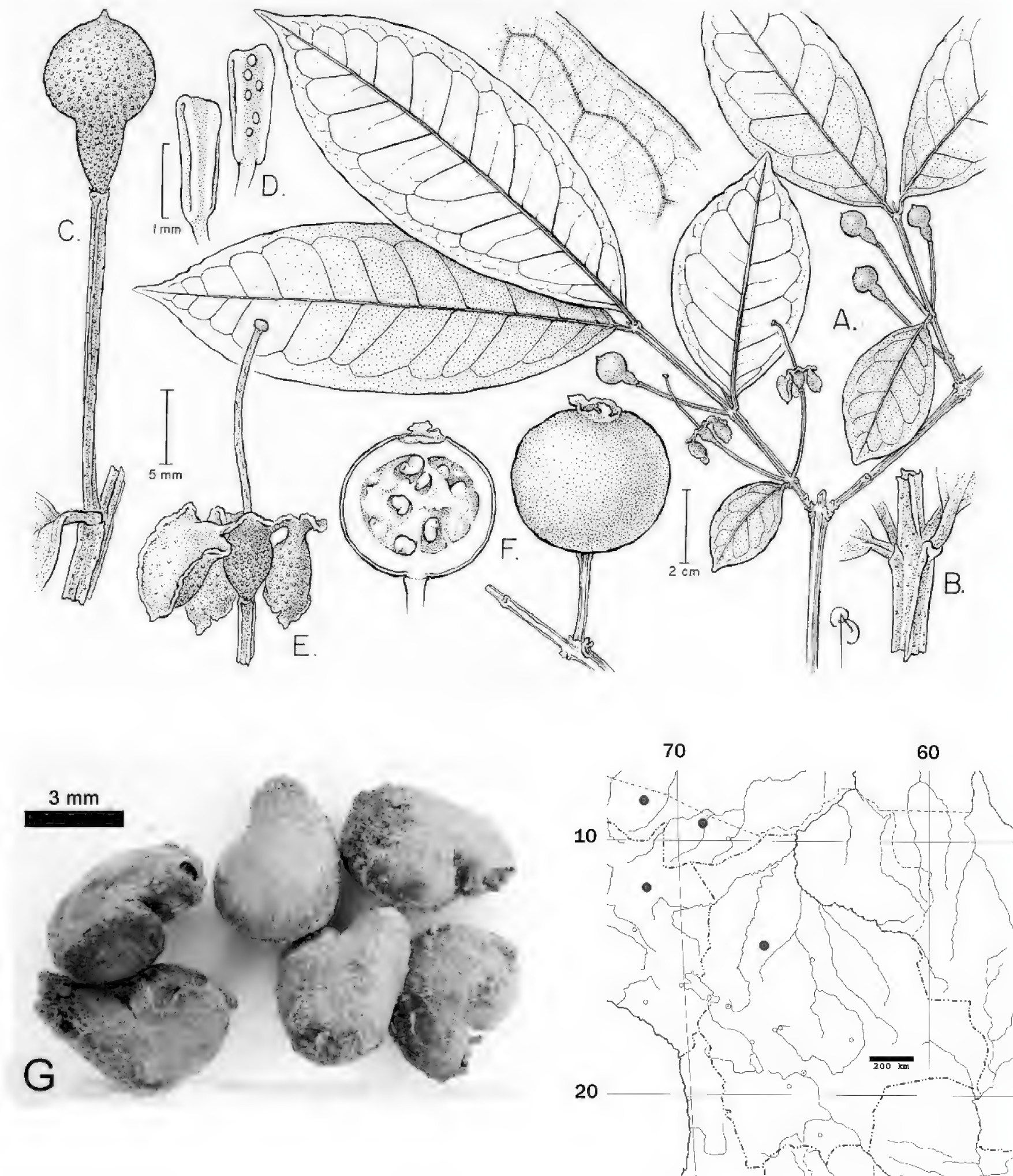


Figure 3. *Psidium acidum*: illustration, photo, and map. **A.** Flowering branch. **B.** Detail of winged twig. **C.** Closed flower bud. **D.** Anthers with multiple glands. **E.** Flower after anthesis. **F.** Fruit, whole and sectioned. **G.** Seeds. (A–E from Perea et al. 2098, ASU0005139; F, G from Cerón 3634, ASU0005129).

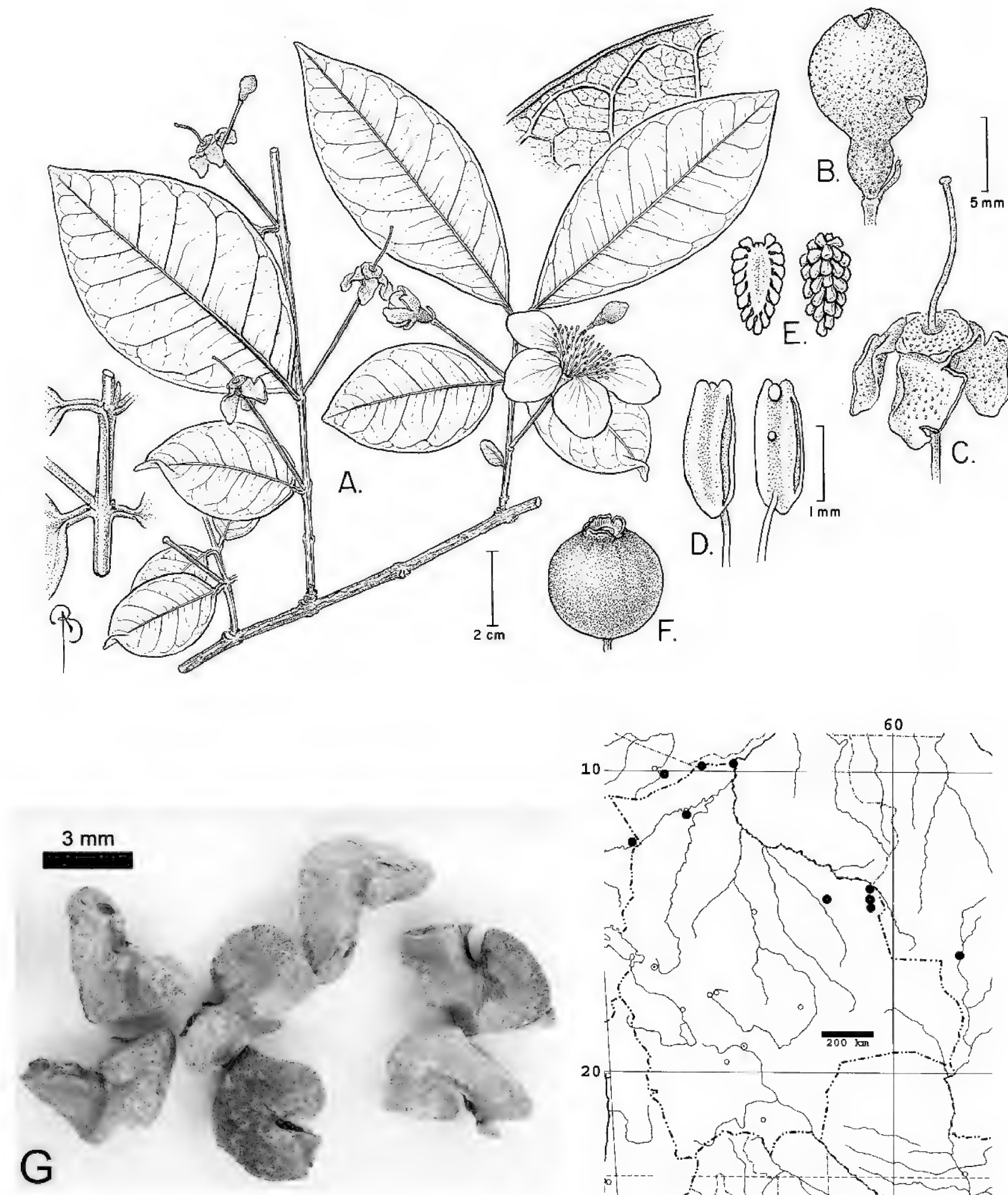


Figure 4. *Psidium acutangulum*: illustration, photo, and map. **A.** Branch with flowers at various stages; uniflorous and dichasial inflorescences; detail of leaf venation and winged twigs. **B.** Flower bud beginning to open; with one persistent bracteole. **C.** Flower after anthesis showing irregular opening of calyx. **D.** Two views of anther, showing terminal gland and additional gland below. **E.** Two views of peltate placenta with ovules, outwardly directed on left, inwardly directed on right (placenta attachment not included would be a membrane near center of right view). **F.** Fruit with the calyx mainly detached. **G.** Angular shaped seeds. (A–C from *Oliveira* 572, ASU0005124; D from *Huamantupa* 7813, ASU0018795; E from *Foster* 738, ASU0005150; F, from *Mutchnick* 1041, ASU0005090; G from *Mutchnick* 1275, ASU0005080).

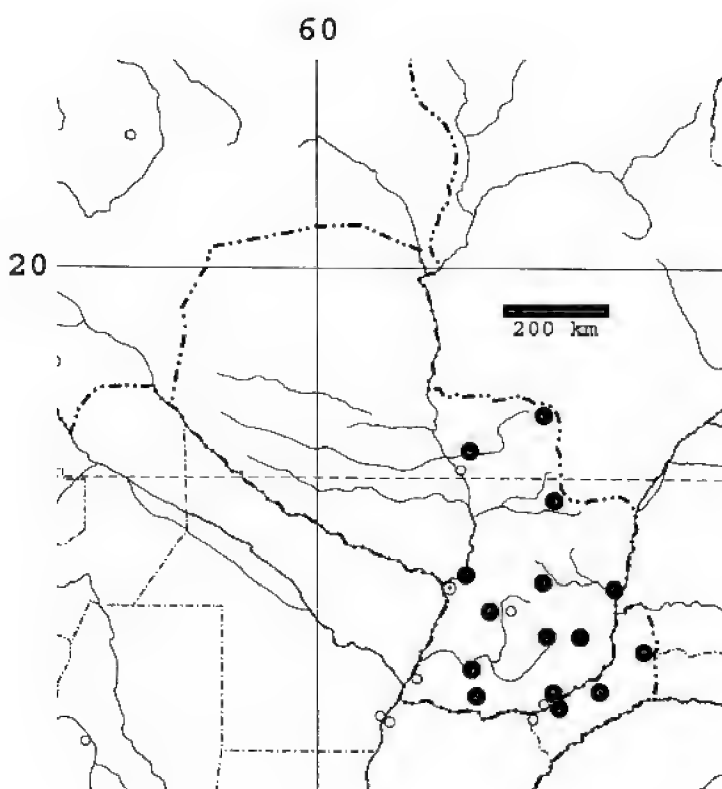
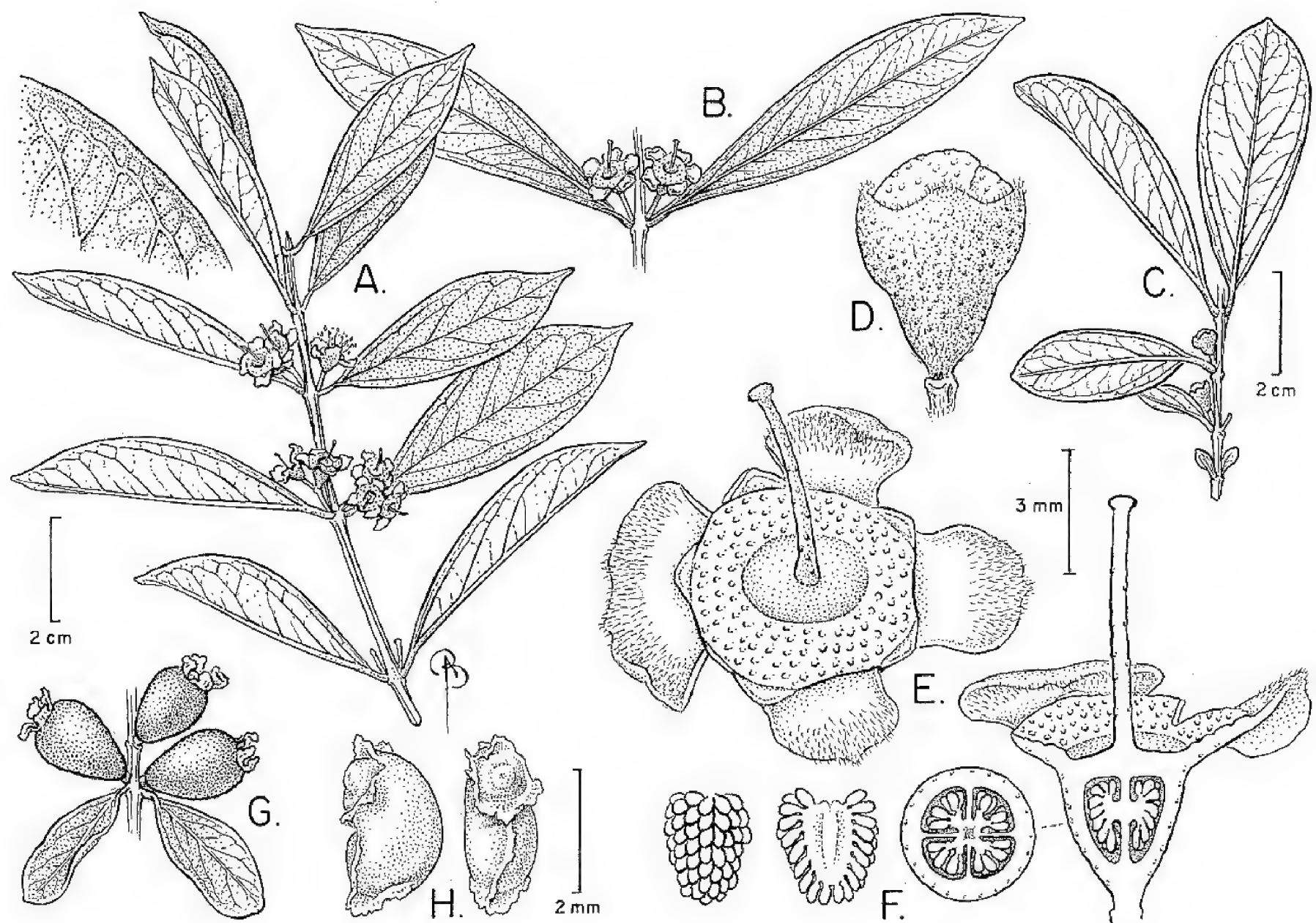


Figure 5. *Psidium australe* var. *australe*: illustration and map. **A.** Flowers, twig, and portion of leaf showing venation. **B.** Twig, leaves, and old flowers. **C.** Twig, leaves and flower buds. **D.** Closed flower bud. **E.** Distal view of flower after anthesis. **F.** Longitudinal section of flower bud; cross section of ovary; extracted placenta and ovules: adaxial view on right and abaxial view on left. **H.** Two views of seed with remnants of endocarp attached. (A, E and F from *Silva* 739, ASU0005175; B from *Hatschbach* 55798, ASU0005167; C, D from *Landrum* 8798, ASU0005172; G from *Zardini* 9027, ASU0005408; H from *Oliveira* 359, ASU0005409).

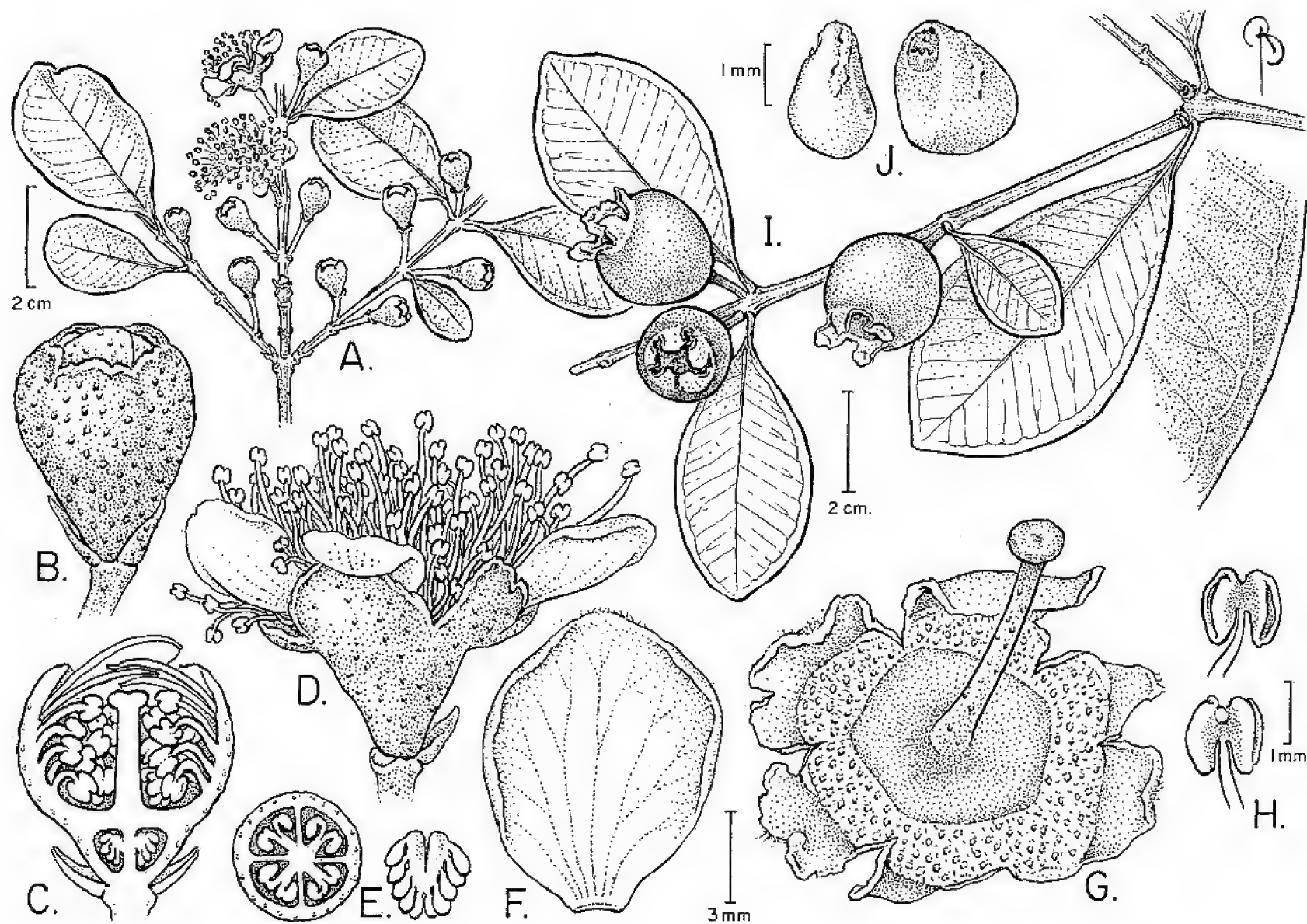


Figure 6. *Psidium cattleianum*: illustration. **A.** Twig at beginning of anthesis. **B.** Flower bud. **C.** Longitudinal section of flower bud. **D.** Opening flower. **E.** Cross section of ovary and extracted placenta with ovules. **F.** Petal. **G.** Apical view of flower after anthesis showing tears in calyx cutting into staminal ring. **H.** Two views of stamen and anther with single terminal gland. **I.** Fruiting twig. **J.** Seeds. (A–C from *Rossato et al.* 4855, ASU0006118; D from photograph of live specimen; E–H from *Folli* 4925, ASU0006103; I from *Baitello* 414, ASU0006091; J from *Carvalho et al.* 6859, ASU0006121).

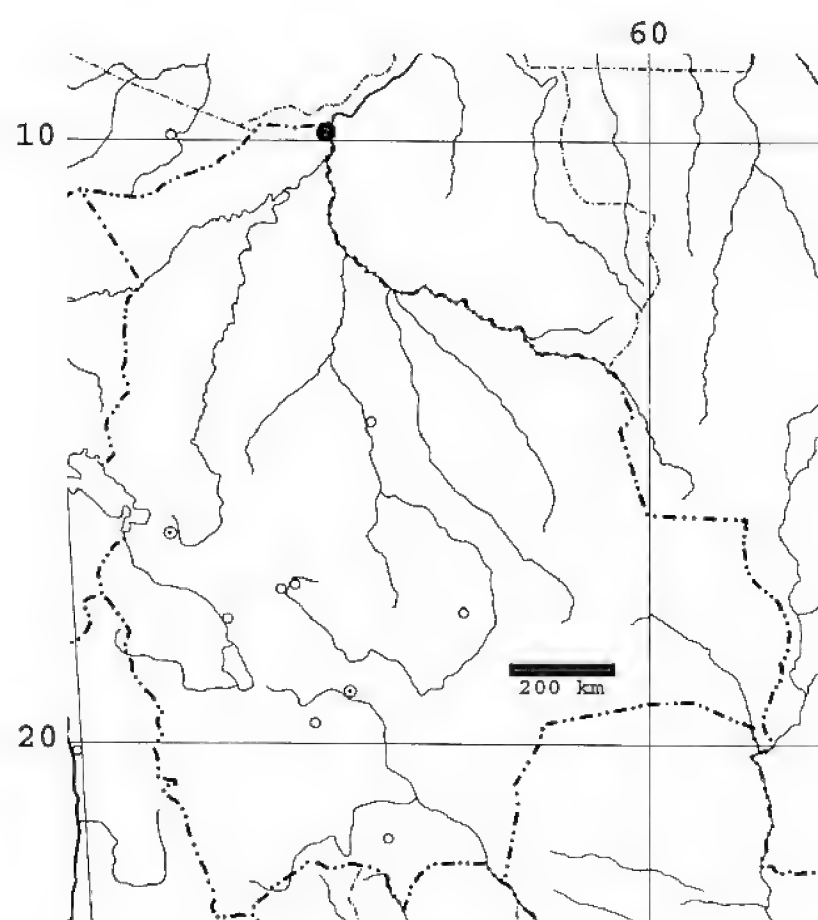
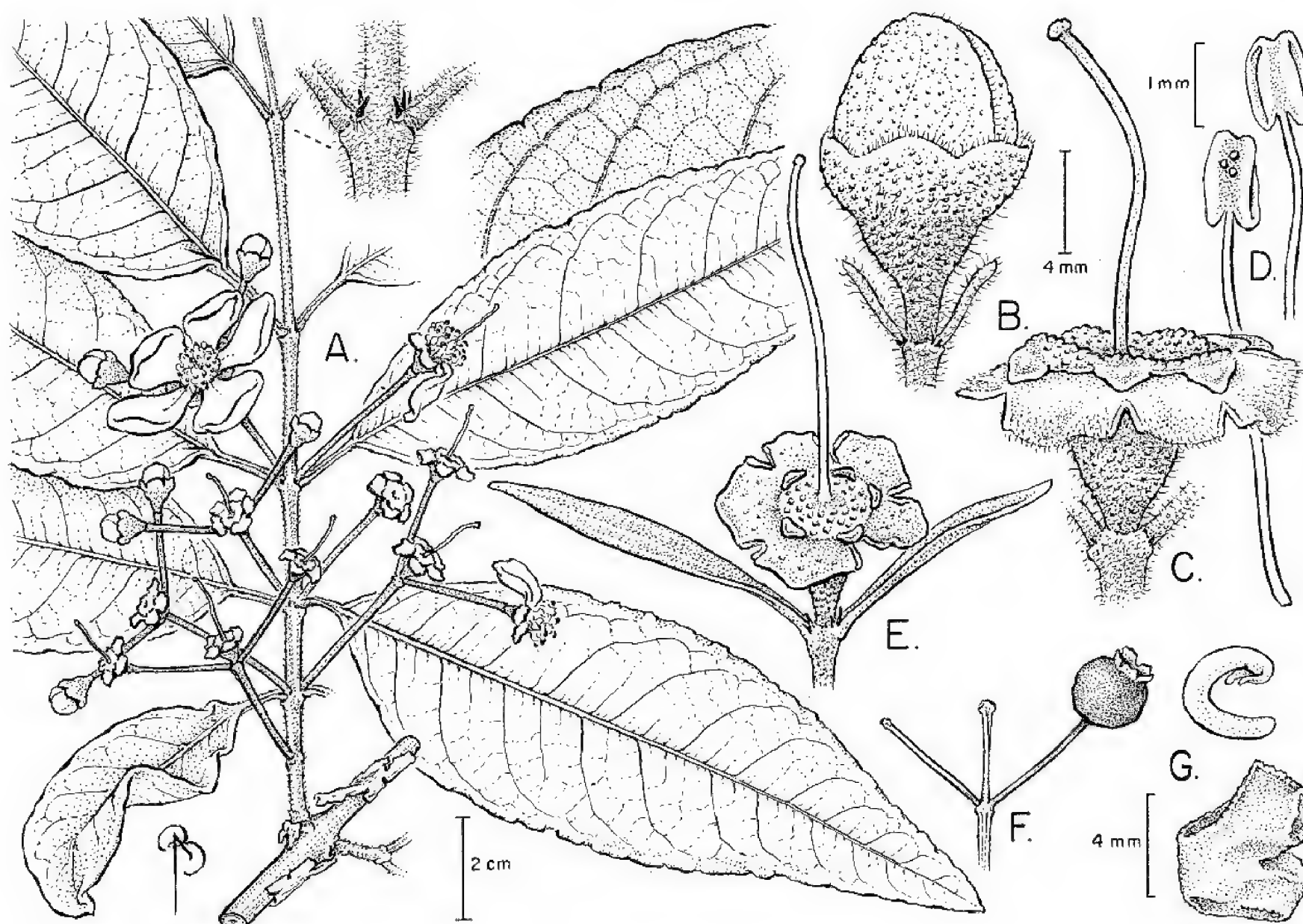


Figure 7. *Psidium densicomum*: illustration and map. **A.** Branch with dichasial inflorescences; close-up of node with colleters present in leaf axils. **B.** Closed flower bud. **C.** Flower after anthesis (pubescent), with tears forming between lobes of calyx. **D.** Stamens with glands in some anthers. **E.** Flower after anthesis (subglabrous). **F.** Fruit. **G.** Angular seed; embryo. (A–D from *Cid 4144*, ASU0006143; E from *Gentry & Perry 78002*, ASU0006142; F, G from *Pipoly et al. 14846*, ASU0006149).

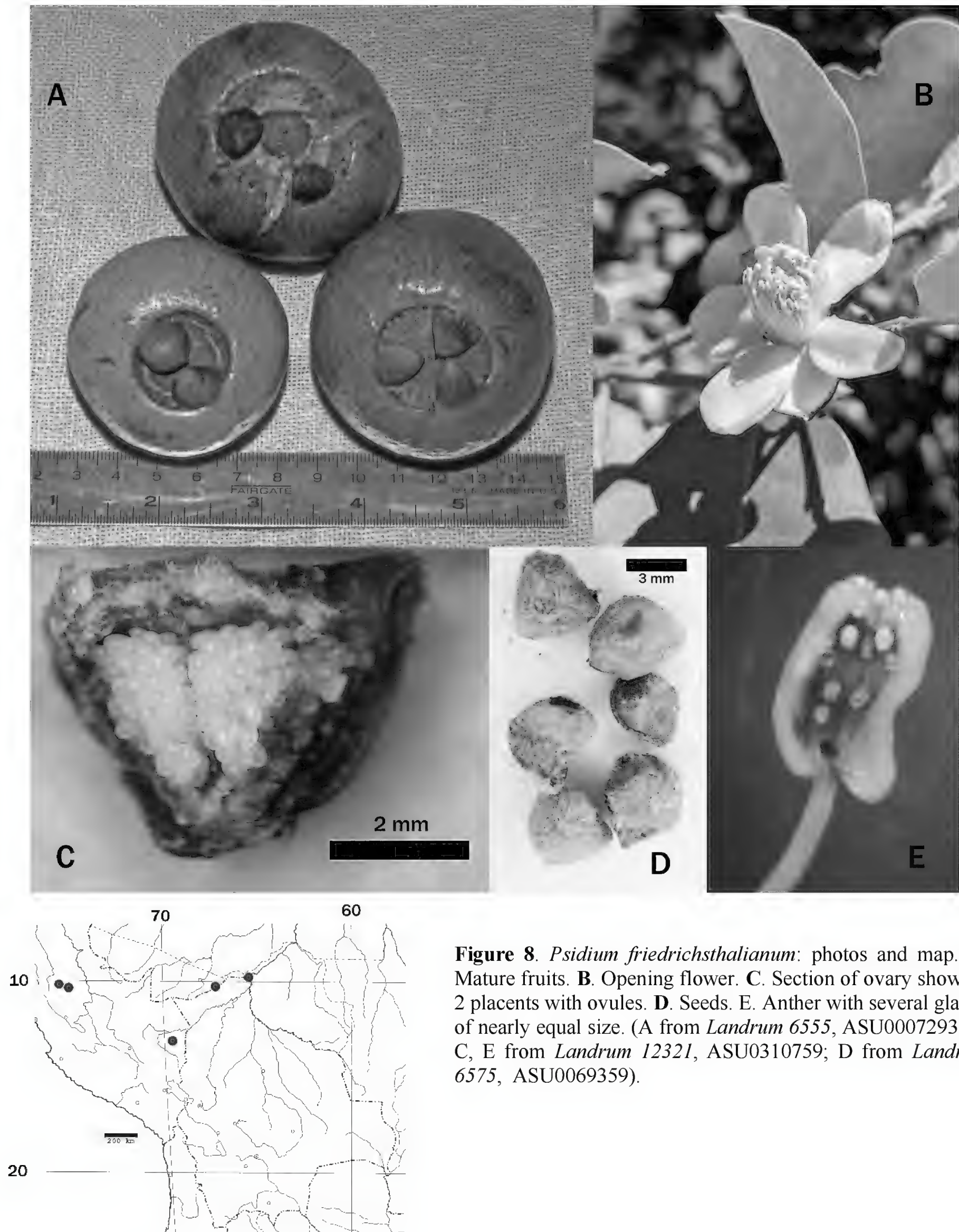
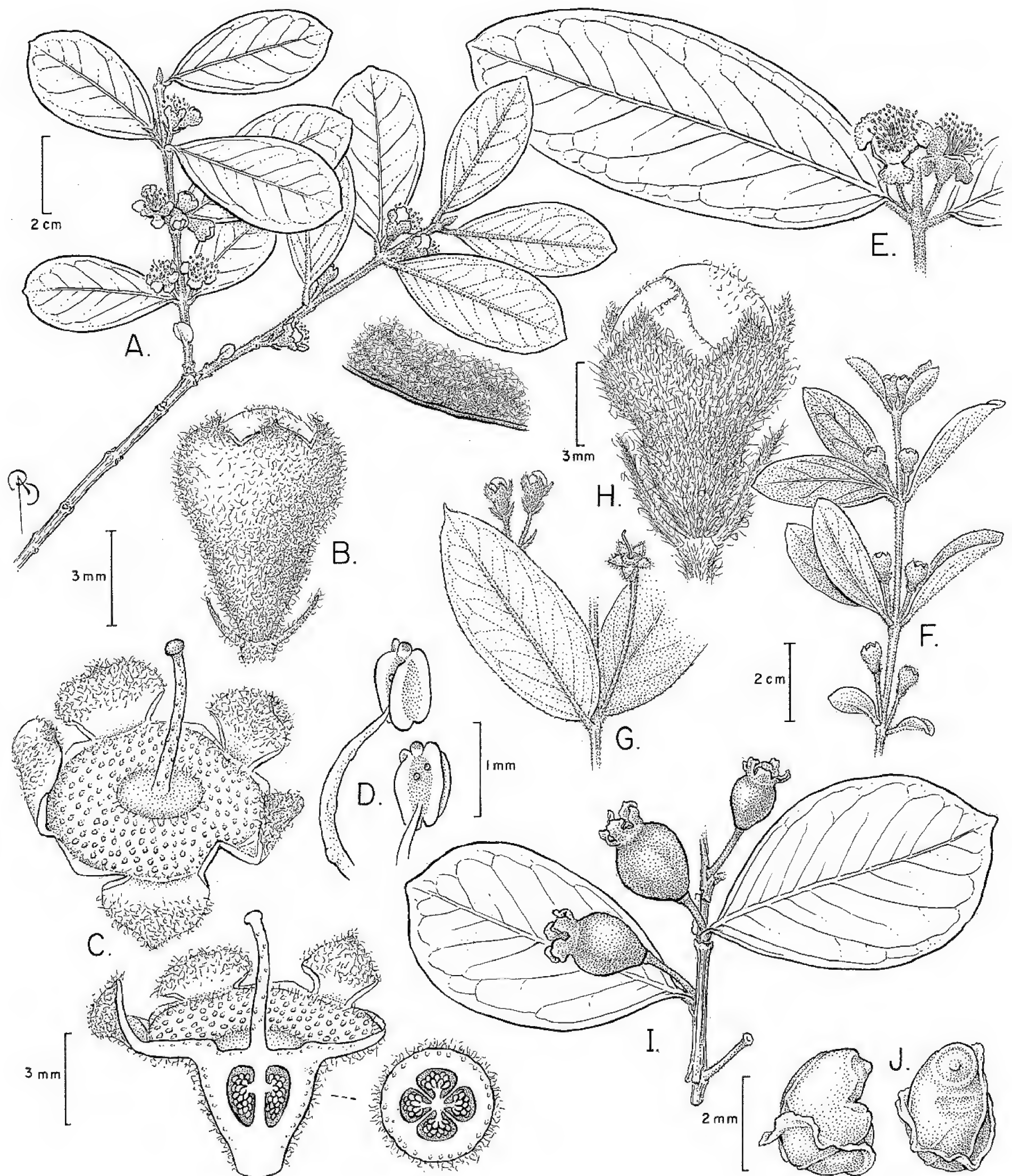


Figure 8. *Psidium friedrichsthalianum*: photos and map. **A.** Mature fruits. **B.** Opening flower. **C.** Section of ovary showing 2 placentas with ovules. **D.** Seeds. **E.** Anther with several glands of nearly equal size. (A from *Landrum 6555*, ASU0007293; B, C, E from *Landrum 12321*, ASU0310759; D from *Landrum 6575*, ASU0069359).



Psidium grandifolium See caption on following page.

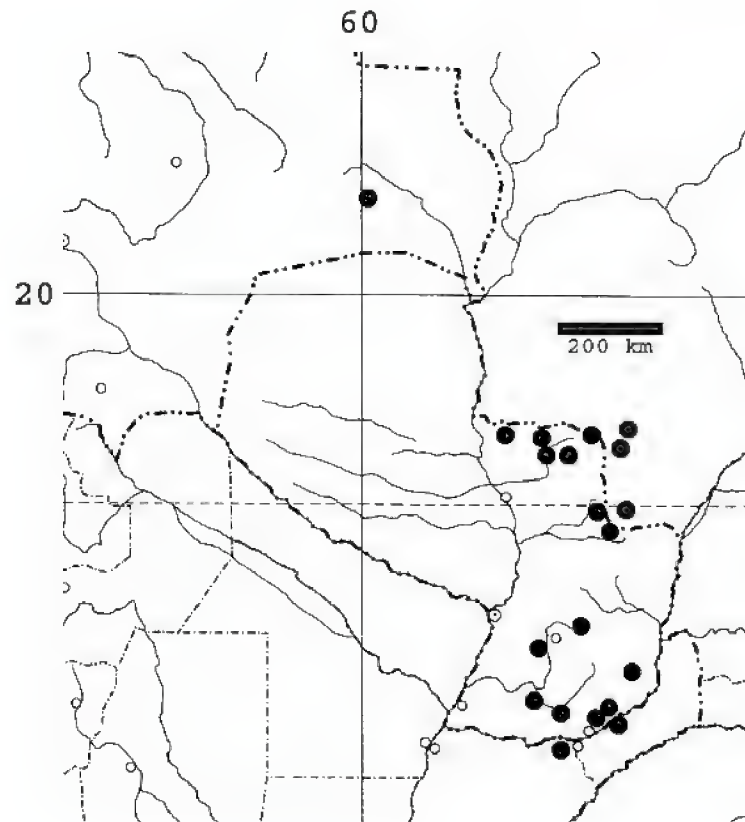


Figure 9. *Psidium grandifolium*: map and illustration (on previous page) showing some of the geographic variation in this species. **A.** Branch with leaves, flower buds, and open flowers; detail of lower leaf surface. **B.** Closed flower bud (northern morphology). **C.** Apex of flower after anthesis, tears in the calyx scarcely cutting the staminal ring; longitudinal and cross sections of similar flowers. **D.** Two views of anther with terminal gland and 2 smaller glands below. **E.** Node with two leaves and two open flowers (northern morphology 1). **F.** Shoot with 3-leaved whorls at 2 nodes and flower buds. **G.** Node with 2 leaves, 2 flower buds (part of a dichasium) and a single flower after anthesis (southern morphology). **H.** Closed flower bud (southern morphology). **I.** Shoot with two alternate leaves (occasionally found in this species) and 3 fruits. **J.** Two views of a seed with remnants of endocarp attached. (A–D from *Harley* 26964, Bahia, Brazil, ASU0007317; E from *Gottsberger* 11-27990, Minas Gerais, Brazil, ASU0007315; F from *Krapovickas* 45798, ASU0007391, San Pedro, Paraguay; G, H, *Carnevali* 4947, Corrientes, Argentina, ASU0006708; I–J from *Souza* 10407, São Paulo, Brazil, ASU0007377). See explanation of morphologies under species discussion.

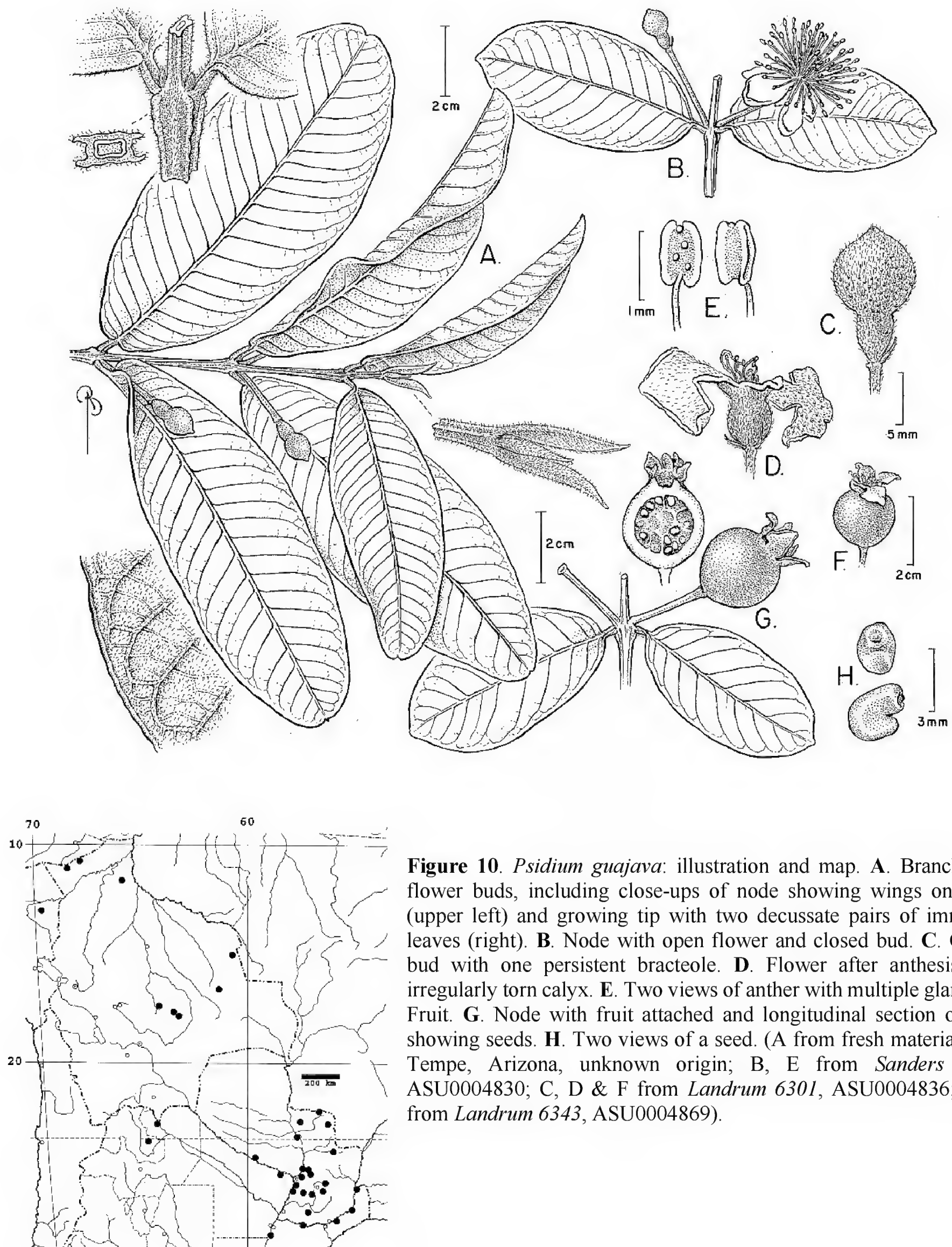
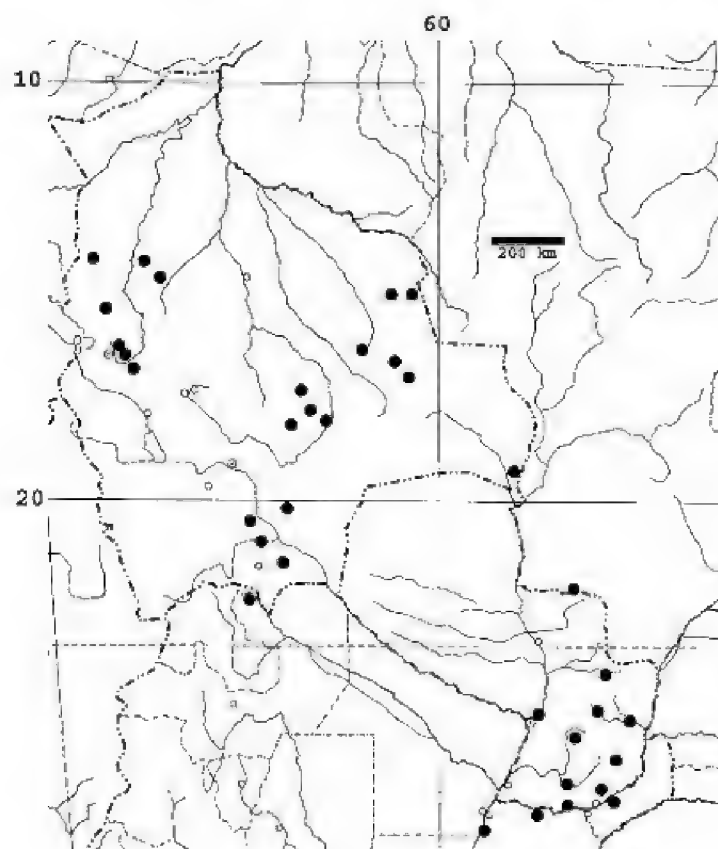
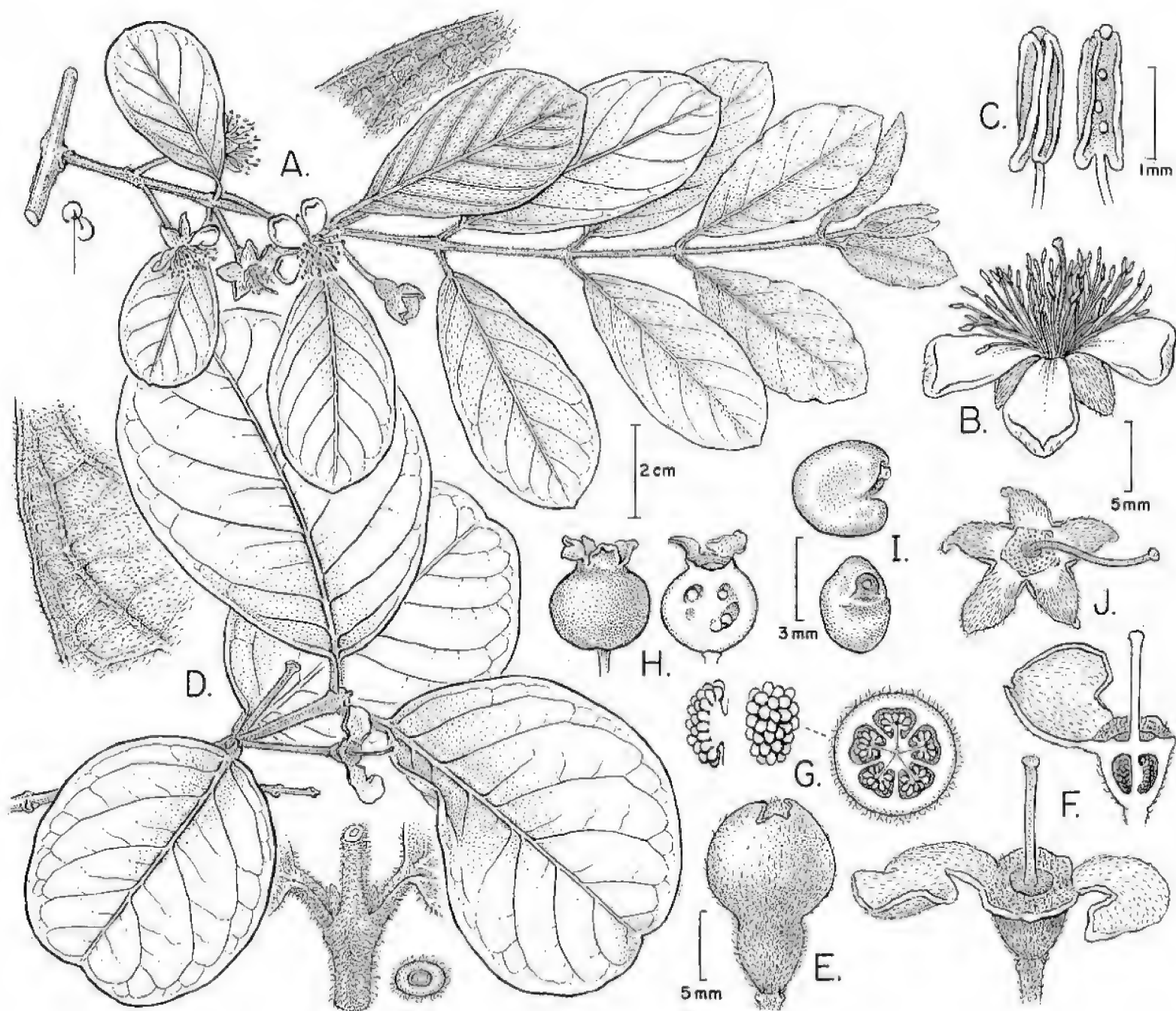


Figure 10. *Psidium guajava*: illustration and map. **A.** Branch with flower buds, including close-ups of node showing wings on twigs (upper left) and growing tip with two decussate pairs of immature leaves (right). **B.** Node with open flower and closed bud. **C.** Closed bud with one persistent bracteole. **D.** Flower after anthesis with irregularly torn calyx. **E.** Two views of anther with multiple glands. **F.** Fruit. **G.** Node with fruit attached and longitudinal section of fruit showing seeds. **H.** Two views of a seed. (A from fresh material from Tempe, Arizona, unknown origin; B, E from *Sanders* 8615, ASU0004830; C, D & F from *Landrum* 6301, ASU0004836; G, H from *Landrum* 6343, ASU0004869).



11. *Psidium guineense*: illustration and map. **A.** Branch with flowers and flower bud; detail of lower leaf surface (atypical morph with appressed hairs on lower leaf surface). **B.** Open flower. **C.** Anthers with glands. **D.** Branch with old flower; detail of lower leaf surface (typical morph with erect spreading hairs). **E.** Closed bud just beginning to open. **F.** Flowers after anthesis with irregularly opening calyx. **G.** Cross section of ovary showing 5 locules; detail of placentation and ovules. **H.** Fruit and fruit in longitudinal section. **I.** Two views of seed. **J.** Flower after anthesis showing calyx tearing in 5 nearly equal lobes. (A, B from *Landrum* 8804, ASU0008042); C from *Landrum* 5676, ASU0004988; D–I from fresh material grown from seeds from Chiapas, Mexico; J from *Nee* 39697, ASU0007532).

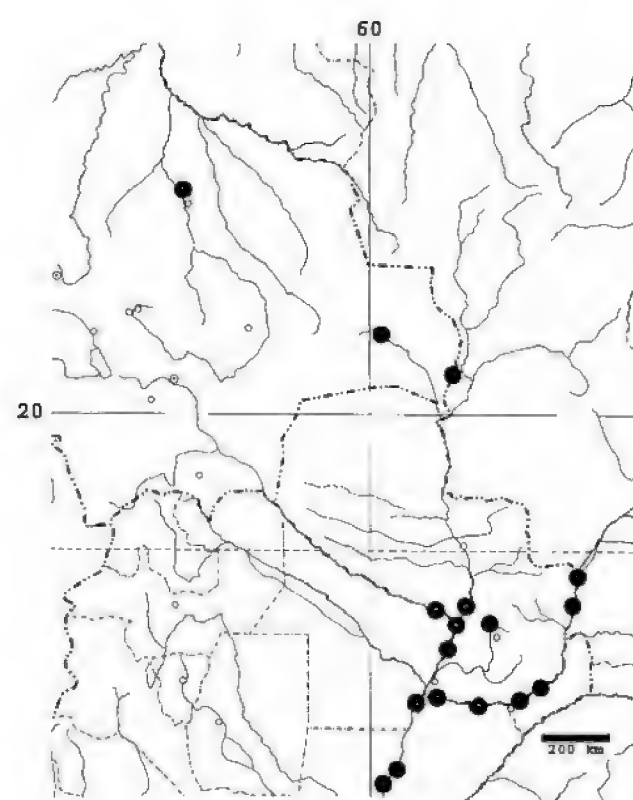
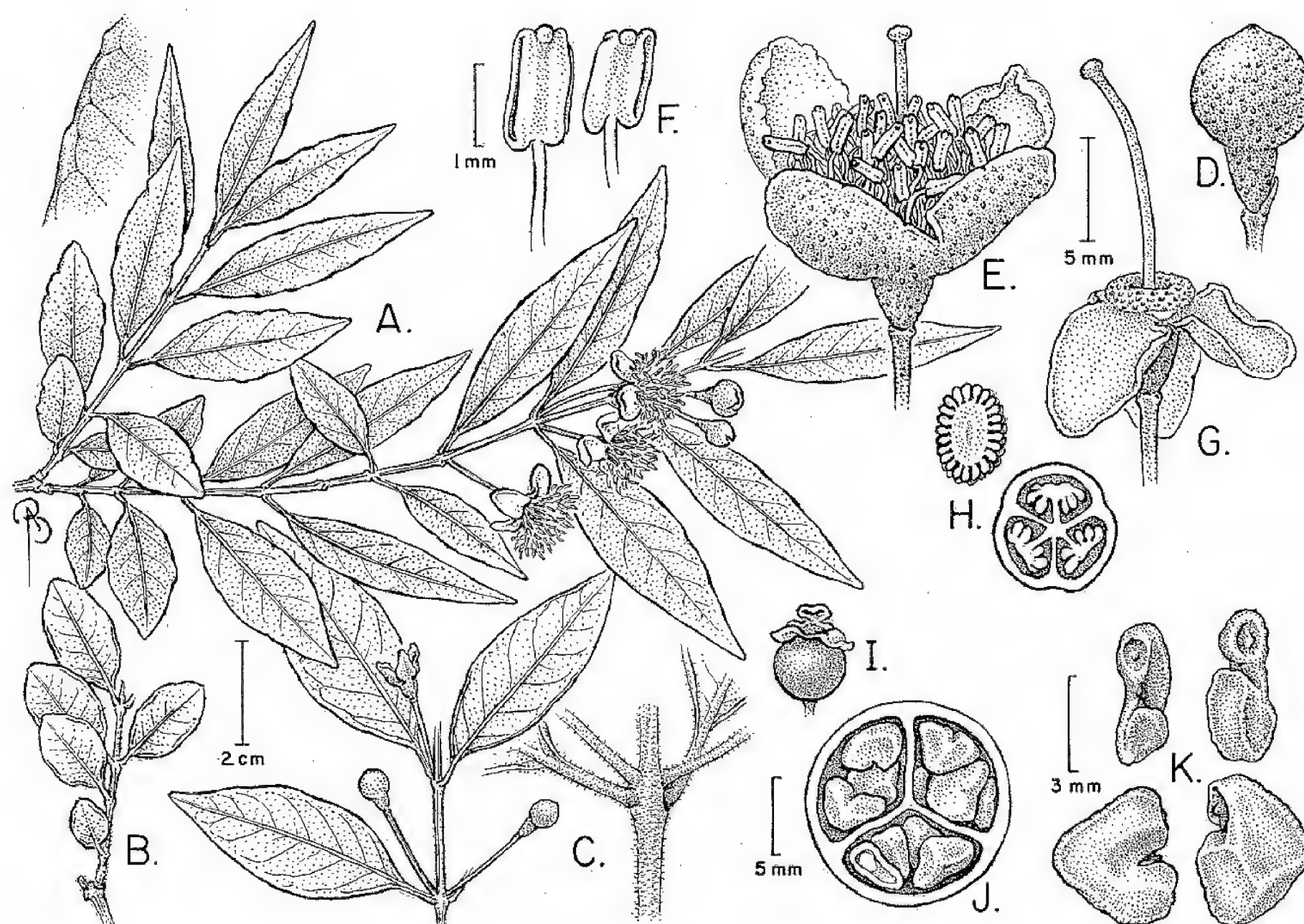


Figure 12. *Psidium kennedyanum*: illustration and map. **A.** Branch with buds and flowers, typical morphology (from Villa Hayes, Presidente Hayes, Paraguay). **B.** Morphology with small elliptic leaves (from Yacuma, Beni, Bolivia). **C.** Portion of twig with flower buds and opening flower; detail of node and peduncles. **D.** Closed flower bud. **E.** Opening flower. **F.** Anthers with one terminal gland. **G.** Flower after anthesis. **H.** Ovary in cross-section and extracted placenta with ovules. **I.** Fruit with persistent calyx. **J.** Cross-section of fruit showing angular seeds. **K.** Views of angular seeds. (A, D, & F–I from *Landrum* 8879, ASU0008073; B from *Foster* 13368, ASU0015615; C, E from *Hatschbach* 52495, ASU0008064; J, K from *Zardini* 25759, ASU0008070).



Psidium laruotteanum. See caption on following page.

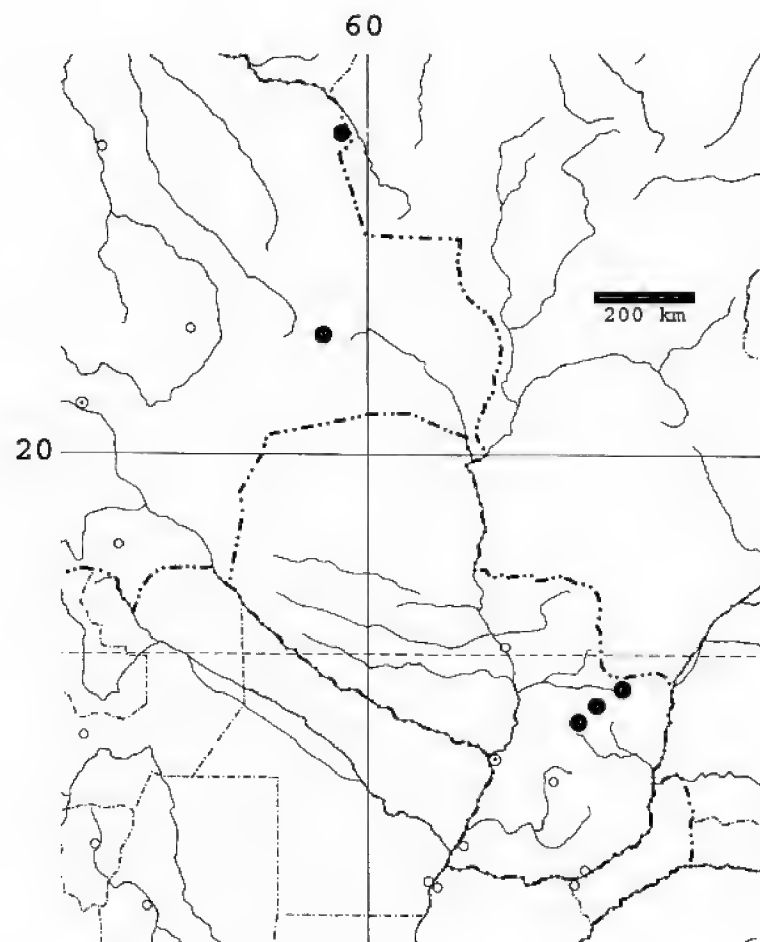


Figure 13. *Psidium laruotteanum*: photographs (see previous page) and map. **A.** Young branch of 0.7 m shrub; note large leaves. **B.** Portion of an herbarium specimen showing full stature of plant with new growth arising from ground level stem. **C.** Close view of flowers. (A, from *Ribas & Pereira 1812*, ASU0008094; B, C, from *Hatschbach 53638*, ASU0008095). Reproduced from Landrum (2003).

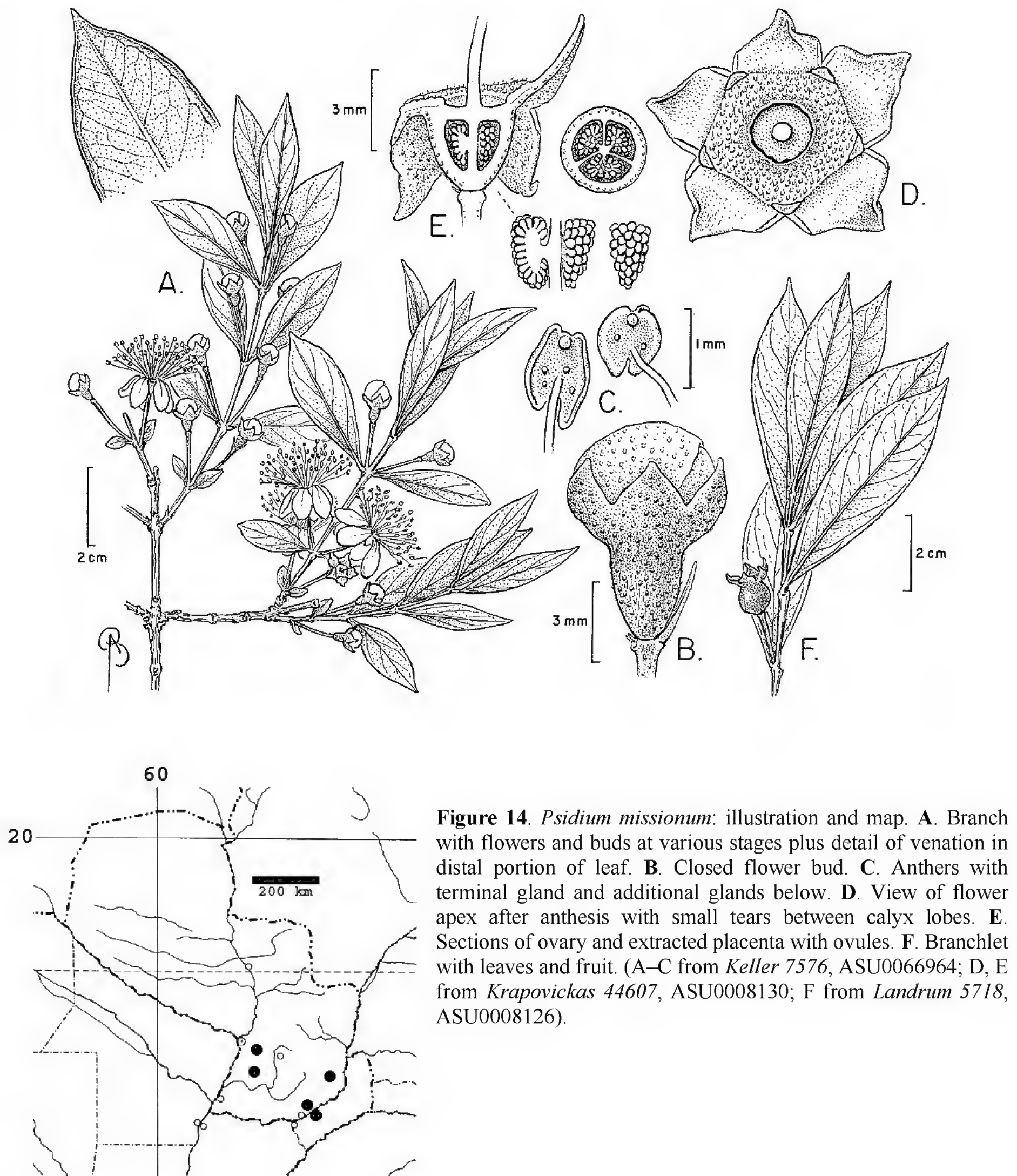


Figure 14. *Psidium missionum*: illustration and map. **A.** Branch with flowers and buds at various stages plus detail of venation in distal portion of leaf. **B.** Closed flower bud. **C.** Anthers with terminal gland and additional glands below. **D.** View of flower apex after anthesis with small tears between calyx lobes. **E.** Sections of ovary and extracted placenta with ovules. **F.** Branchlet with leaves and fruit. (A–C from *Keller* 7576, ASU0066964; D, E from *Krapovickas* 44607, ASU0008130; F from *Landrum* 5718, ASU0008126).

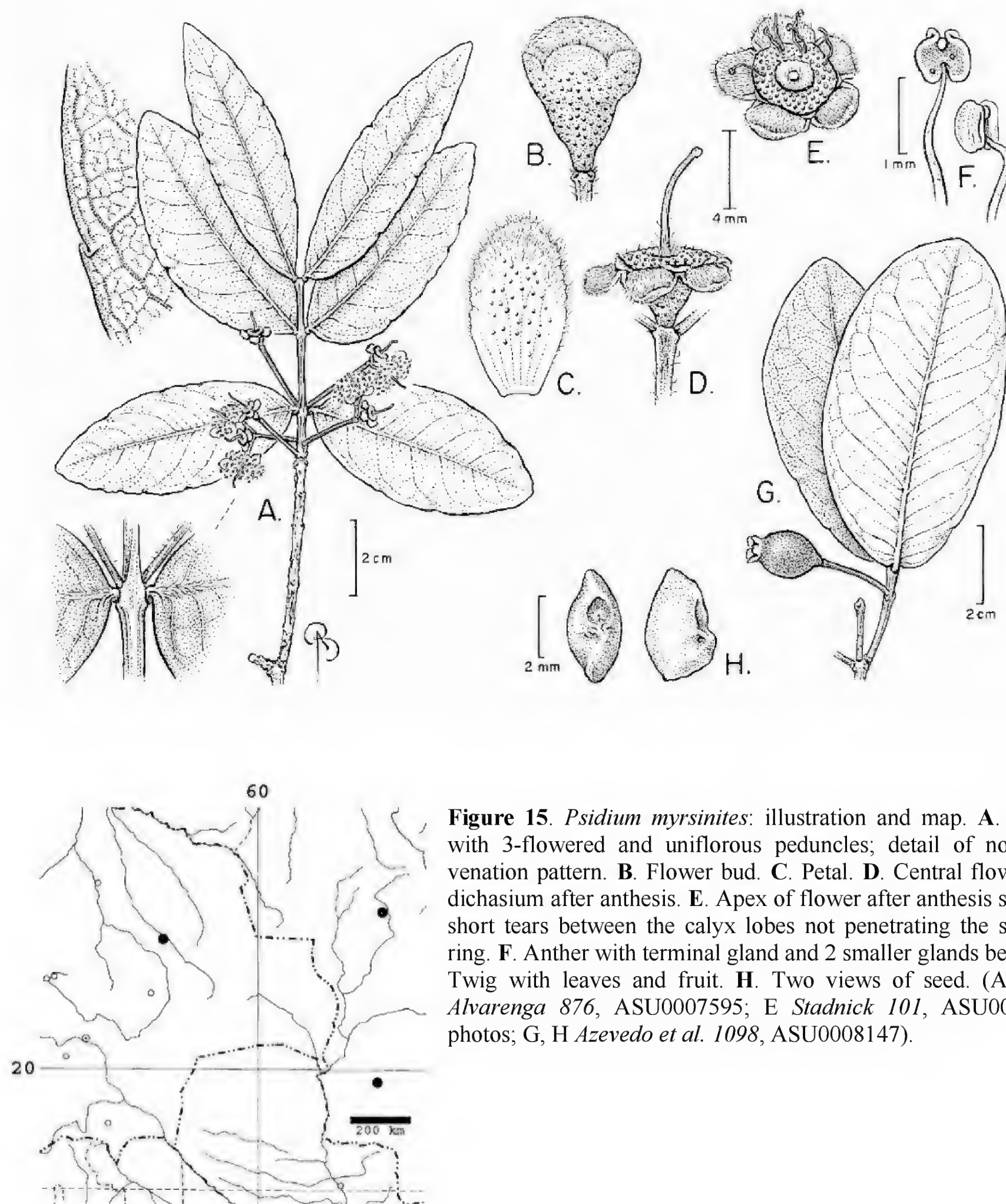


Figure 15. *Psidium myrsinites*: illustration and map. **A.** Branch with 3-flowered and uniflorous peduncles; detail of node and venation pattern. **B.** Flower bud. **C.** Petal. **D.** Central flower of a dichasium after anthesis. **E.** Apex of flower after anthesis showing short tears between the calyx lobes not penetrating the staminal ring. **F.** Anther with terminal gland and 2 smaller glands below. **G.** Twig with leaves and fruit. **H.** Two views of seed. (A—D, F *Alvarenga* 876, ASU0007595; E *Stadnick* 101, ASU0075035-photos; G, H *Azevedo et al.* 1098, ASU0008147).

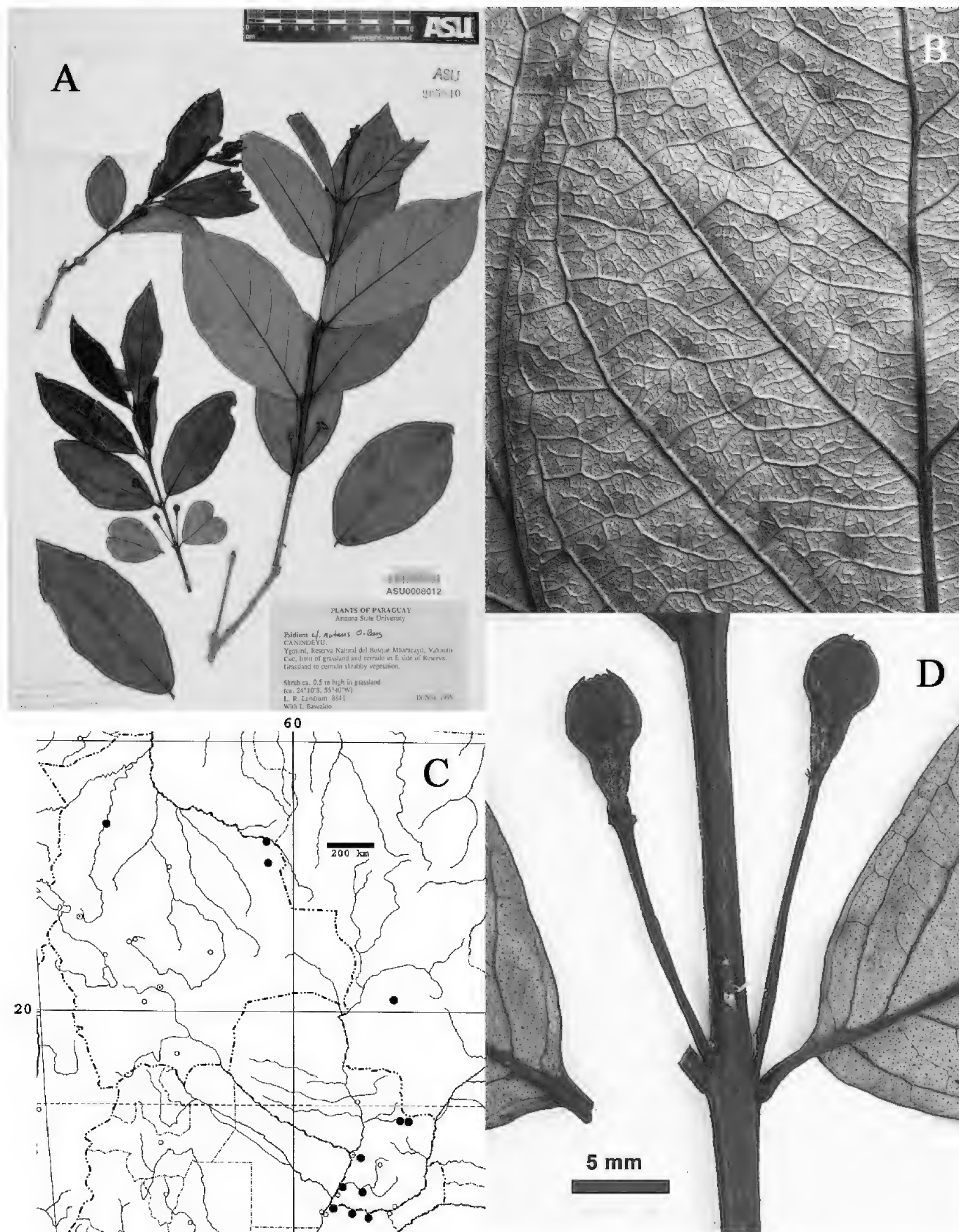
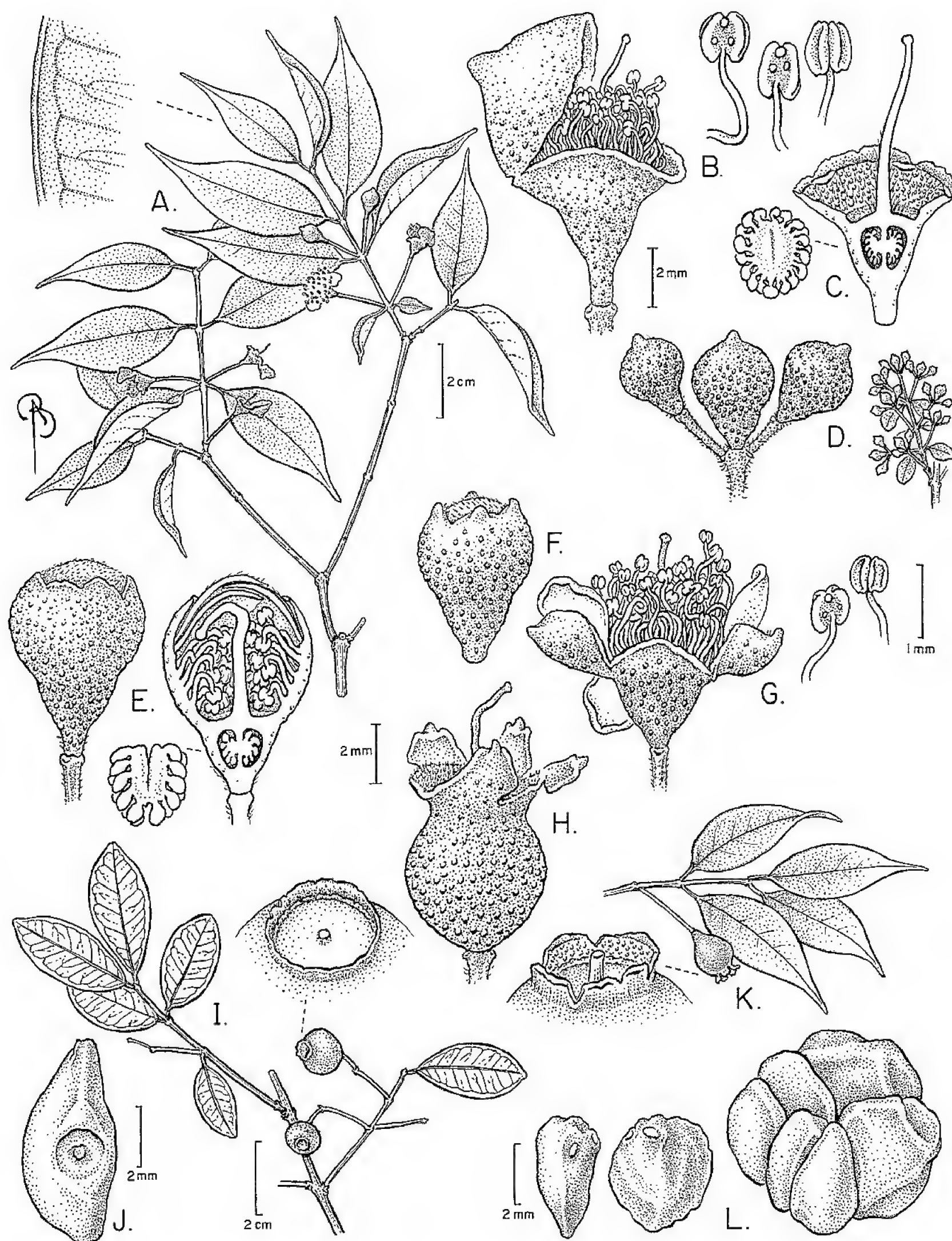


Figure 16. *Psidium nutans*: photos and map. **A.** Herbarium sheet of *P. nutans* from Reserva Natural del Bosque Mbaracayú, Canindeyú, Paraguay. **B.** Leaf venation. **C.** Map. **D.** Flower buds. (A, D from *Landrum 8841*, ASU0008041; B from *Killeen 6974*, ASU0008011).



See caption on next page.

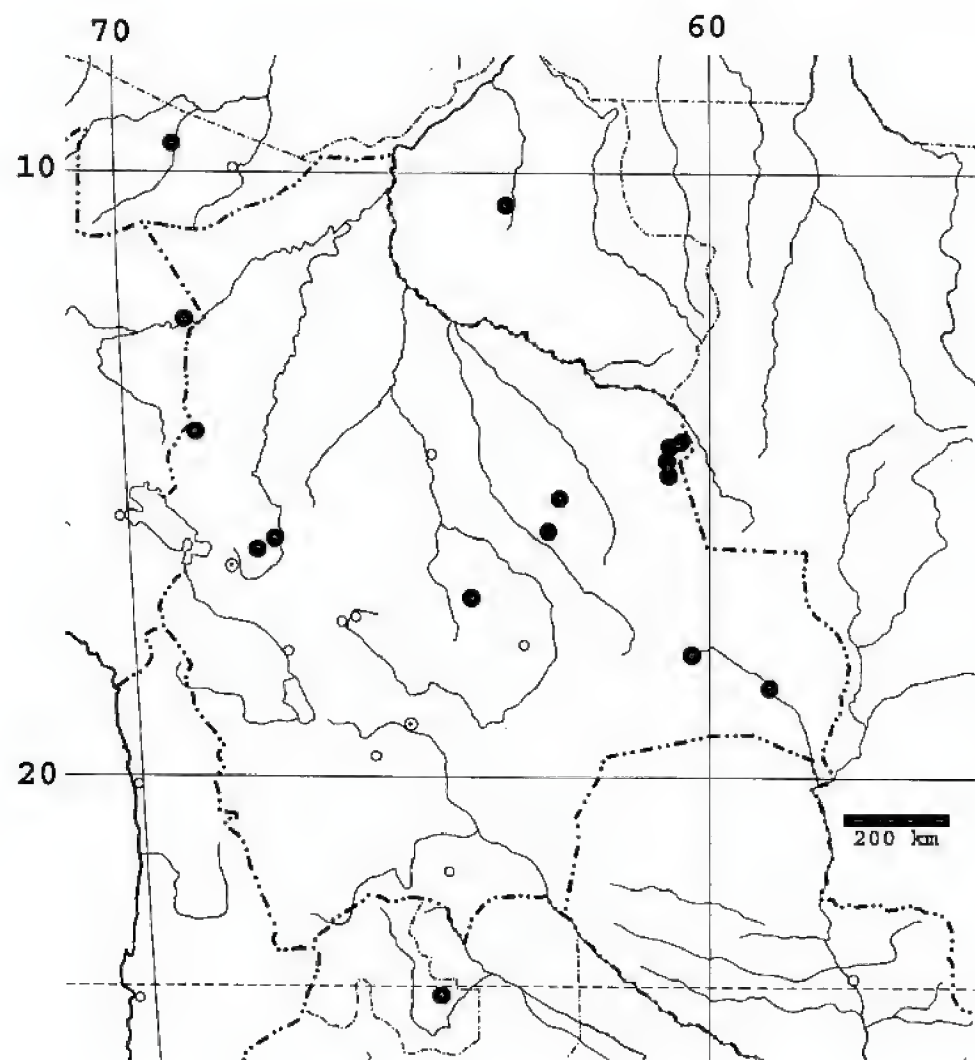


Figure 17. *Psidium oligospermum*: illustration (on previous page) and map. **A.** Flowering branch with detail of venation. **B.** Opening flower with calyptra; anthers with terminal gland and two smaller glands below. **C.** Longitudinal section of flower with peltate placenta extracted. **D.** Three-flowered dichasium and cluster of dichasia. **E.** Flower bud, placenta with ovules extracted and longitudinal section of bud. **F.** Flower bud from side; calyx with apical protuberances, these evident in G and H also. **G.** Opening flower from side; two views of an anther, one showing terminal gland and two smaller glands below. **H.** Young fruit from side. **I.** Twig with fruits; apical view of fruit with calyx and staminal ring having fallen. **J.** Seed. **K.** Twig with leaves and fruit; view of fruit apex with calyx having fallen and staminal ring persisting. **L.** Cluster of seeds from a fruit and two individual seeds showing flat and rounded sides. (A–C from *Pirani & Kallunki* 2664, ASU0014404; D from *Núñez* 8602, ASU0014407; E from *Smith* 9729, ASU0014343; F–G from *Landrum* 6524, ASU0005024; H from *Landrum* 6518, ASU0005010; I–J from *Guillén & Lazo* 4340, ASU0015601; K–L from *Landim* 561, ASU0014337).



Figure 18. *Psidium salutare*: branchlets with leaves and flowers or young fruits. **A.** var. *mucronatum*. **B.** var. *sericeum*. **C.** var. *salutare*. **D.** var. *salutare*. (A from Landrum 3856, NY; B from Venturi 7582, F; C from Zardini & Zavala 45687, ASU0060391; D from Rodriguez & Surubí 549, ASU0005032).

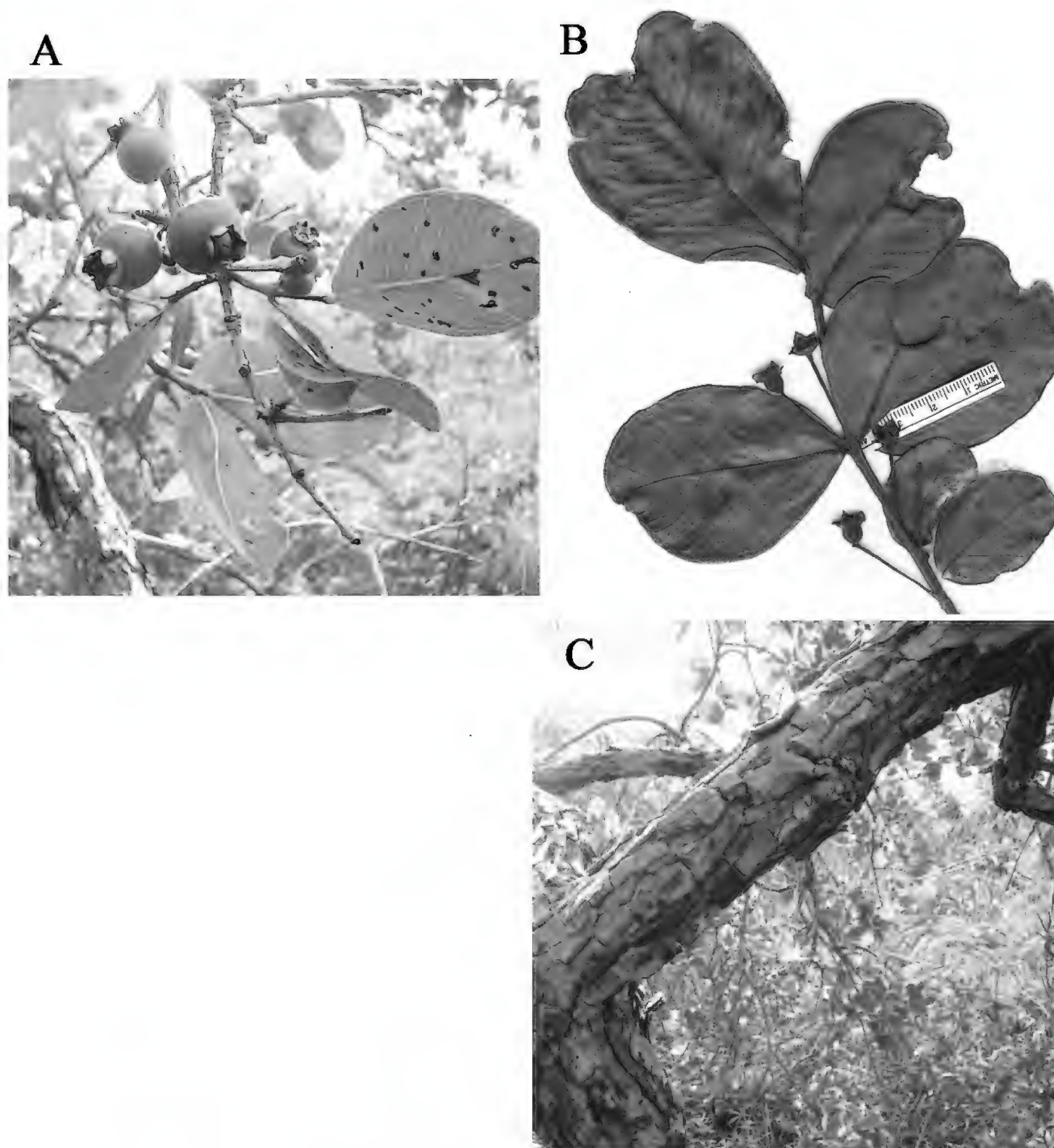


Figure 19. *Psidium salutare* var. *pohlianum*. **A.** Young branch with fruits. **B.** twig with very young fruits. **C.** Stem showing rough bark. (A, C photos by M. Alves of *Roque et al.* 3363, photo specimen at ASU; B from *Irwin et al.* 9101, NY).

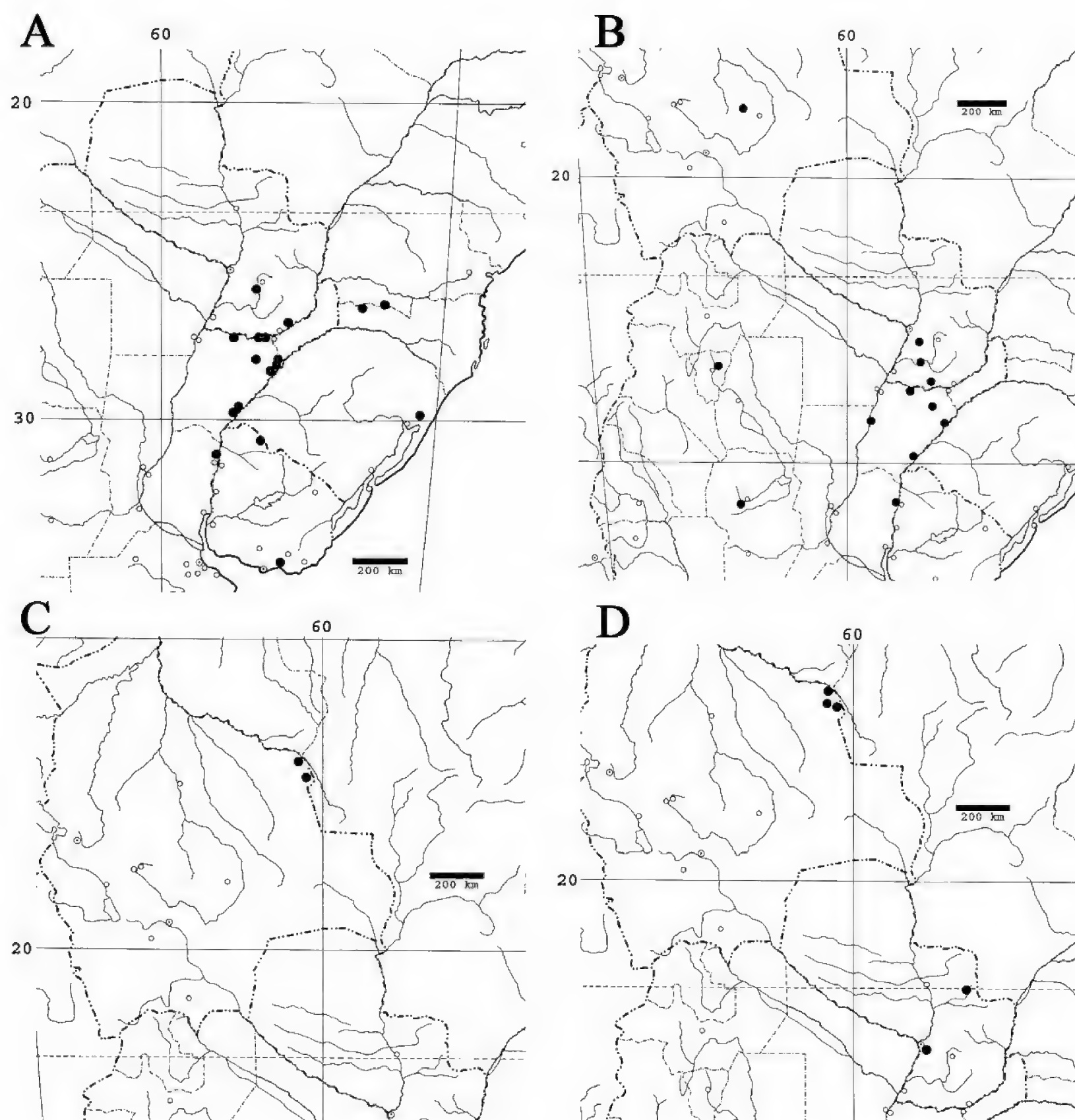


Figure 20. *Psidium salutare*: distribution maps. **A.** var. *mucronatum*. **B.** var. *sericeum*. **C.** var. *pohlianum*. **D.** var. *salutare*.



Figure 21. *Psidium striatulum* var. *rondoniense*. Herbarium sheet from Bolivia, Santa Cruz, Prov. Velasco. (Quevedo 2389, ASU0015612).

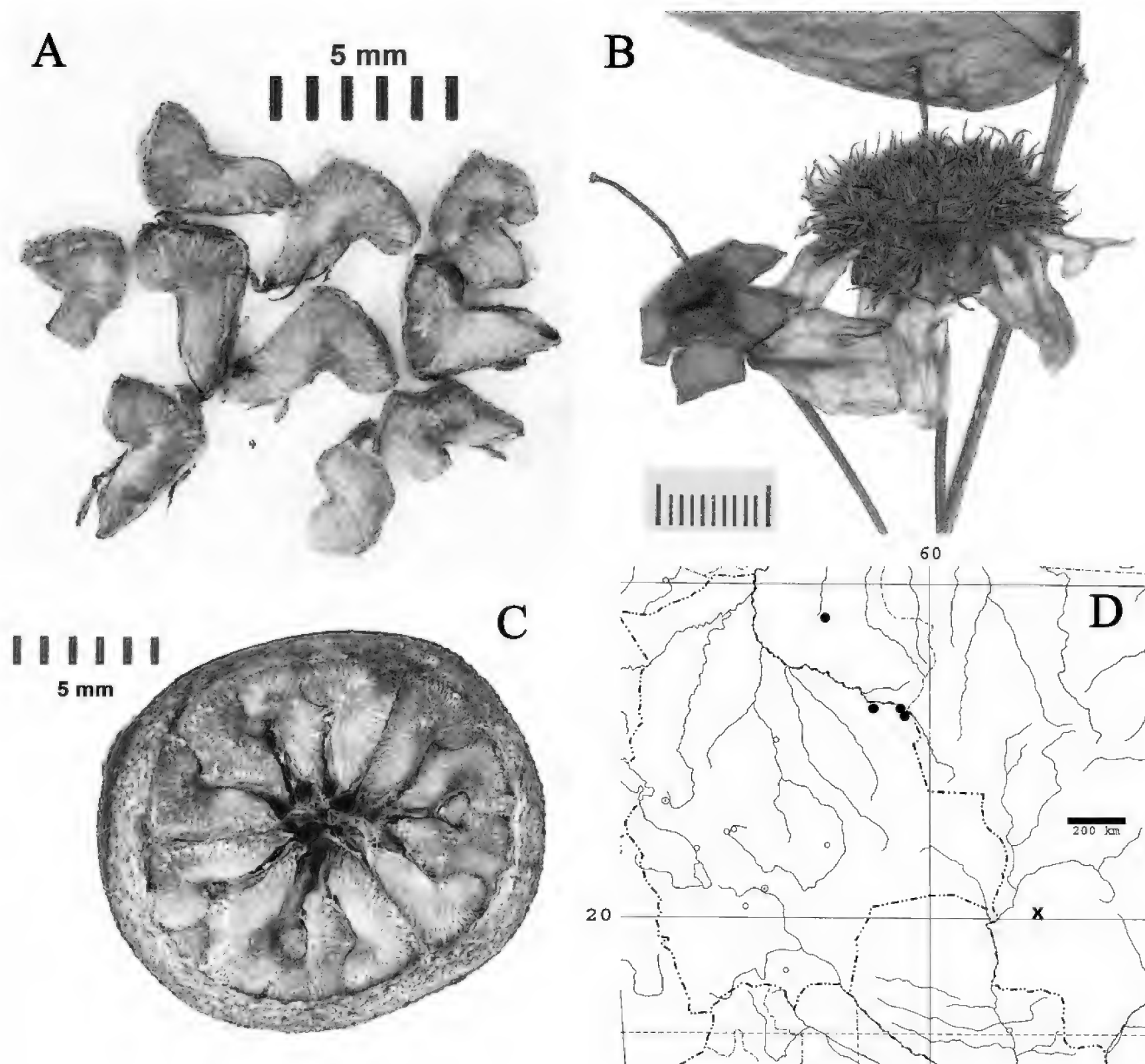


Figure 22. *Psidium striatulum*: photos of details and map. **A.** Seeds with typical angular shape; **B.** flowers of at anthesis and post anthesis. **C.** Cross section of fruit showing arrangement of seeds. **D.** Map of distribution in Bolivia and adjacent Brazil, dots = *P. striatulum* var. *rondoniense*, X = *P. striatulum* var. *striatulum*. (A & C, Davis 807, NY; from Guyana; B, Zarucchi 2722, NY, isotype of *P. striatulum* var. *rondoniense*).

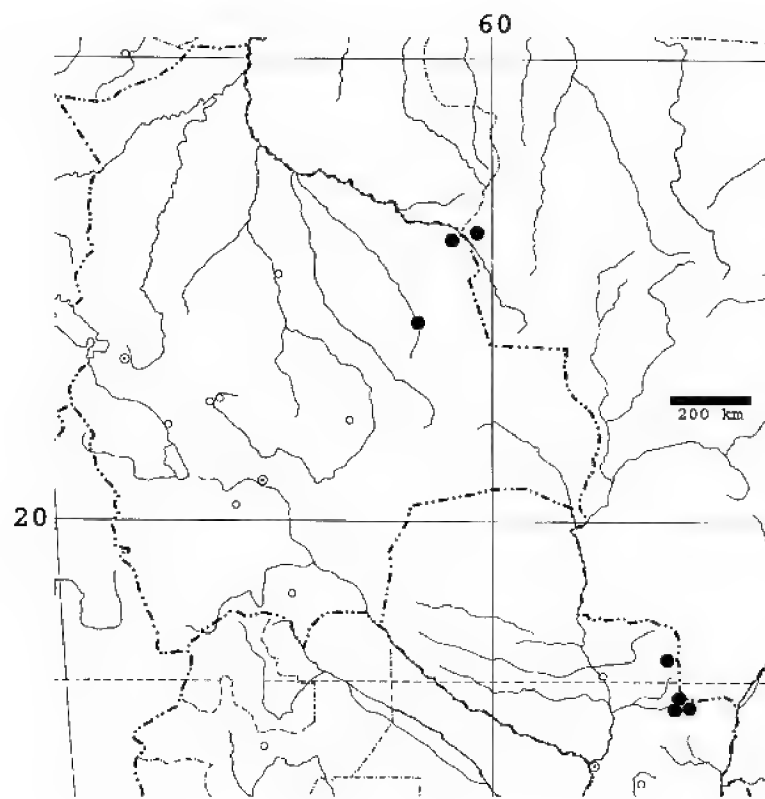
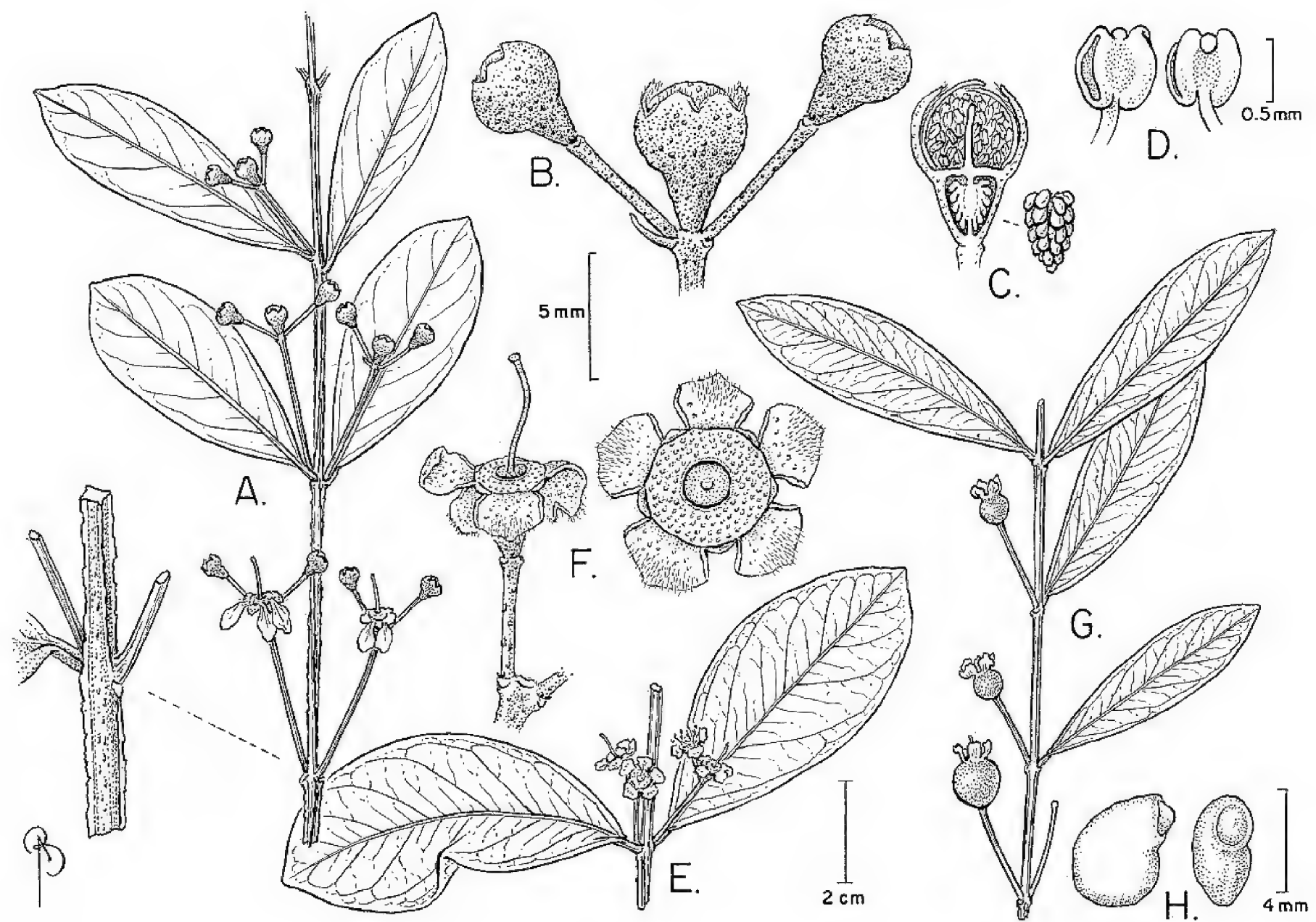


Figure 23. *Psidium suffruticosum*: illustration and map. **A.** Branch with leaves and dichasial inflorescences; detail of winged twigs. **B.** Dichasial 3-flowered inflorescence with flowers at various stages (flower buds have the calyx nearly closed at first). **C.** Longitudinal section of flower with ovules extracted. **D.** Two views of anther with a single terminal gland. **E.** Node with two leaves and remnants of two dichasia. **F.** Flower after anthesis showing tears between calyx lobes. **G.** Twig with fruits. **H.** two views of seed with prominent operculum. (A–D from *Gottsberger 11-121079*, ASU0005191; E, F from *Hatschbach 50322*, ASU0005426; G, H from *Souza et al. 10752*, ASU0005420).

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Abbott 15905	<i>P. kennedyanum</i>	Brunner 1377	<i>P. guajava</i>
Ahumada 2462	<i>P. kennedyanum</i>	Buchanan-Smith 78	<i>P. guajava</i>
Altamirano 3381	<i>P. acutangulum</i>	Buchtien 630	<i>P. guineense</i>
Araujo-M. 2629	<i>P. guineense</i>	Buchtien 7391	<i>P. guineense</i>
Arbo 1239	<i>P. guineense</i>	Burkart 30989	<i>P. guajava</i>
Arbo 1505	<i>P. nutans</i>	Burkart 31006	<i>P. guineense</i>
Arbo 1754	<i>P. grandifolium</i>	Buttura 1004	<i>P. australe</i> var. <i>australe</i>
Arbo 1925	<i>P. australe</i> var. <i>australe</i>	Caballero M. 893	<i>P. kennedyanum</i>
Arbo 1926	<i>P. salutare</i> var. <i>sericeum</i>	Caballero M. 1234	<i>P. australe</i> var. <i>australe</i>
Arbo 6402	<i>P. salutare</i> var. <i>sericeum</i>	Caballero M. 1413	<i>P. salutare</i> var. <i>salutare</i>
Arbo 9009	<i>P. guajava</i>	Caballero M. 1878	<i>P. australe</i> var. <i>australe</i>
Arroyo 125	<i>P. oligospermum</i>	Cabral 186	<i>P. grandifolium</i>
Arroyo 1341	<i>P. acutangulum</i>	Cabral 199	<i>P. missionum</i>
Arroyo 1363	<i>P. acutangulum</i>	Cabrera 28988	<i>P. guineense</i>
Arroyo 24046	<i>P. oligospermum</i>	Carnevali 1317	<i>P. salutare</i> var. <i>mucronatum</i>
Balderrama 161	<i>P. guineense</i>	Carnevali 2243	<i>P. salutare</i> var. <i>sericeum</i>
Bang 253	<i>P. guajava</i>	Carnevali 3191	<i>P. salutare</i> var. <i>mucronatum</i>
Bang 287	<i>P. guineense</i>	Carnevali 4947	<i>P. grandifolium</i>
Bang 1688	<i>P. guajava</i>	Carnevali 5169	<i>P. grandifolium</i>
Bang 2830	<i>P. guineense</i>	Carrion 460	<i>P. acutangulum</i>
Bang 2831	<i>P. guineense</i>	Carrion 689	<i>P. guineense</i>
Bang 2832	<i>P. guineense</i>	Castro 16	<i>P. oligospermum</i>
Bartlett 21162	<i>P. salutare</i> var. <i>mucronatum</i>	Cuezzo &	
Bartlett 21279	<i>P. salutare</i> var. <i>mucronatum</i>	de la Sota 1594	<i>P. guajava</i>
Basualdo 766	<i>P. guajava</i>	Curran 33	<i>P. guineense</i>
Basualdo 784	<i>P. guajava</i>	Curran 71	<i>P. kennedyanum</i>
Basualdo 862	<i>P. missionum</i>	Degen 459	<i>P. guajava</i>
Basualdo 1010	<i>P. grandifolium</i>	Degen 899	<i>P. australe</i> var. <i>australe</i>
Basualdo 1027	<i>P. guineense</i>	Degen 1004	<i>P. guineense</i>
Basualdo 1030	<i>P. missionum</i>	Degen 1244	<i>P. grandifolium</i>
Basualdo 1085	<i>P. guajava</i> X <i>guineense</i>	Degen 1245	<i>P. grandifolium</i>
Basualdo 1103	<i>P. australe</i> var. <i>australe</i>	Degen 1670	<i>P. guajava</i> X <i>guineense</i>
Basualdo 1197	<i>P. guajava</i>	Degen 1791	<i>P. nutans</i>
Basualdo 1365	<i>P. guajava</i>	Degen 2093	<i>P. guineense</i>
Basualdo 1510	<i>P. guajava</i>	Degen 2101	<i>P. grandifolium</i>
Basualdo 1514	<i>P. guajava</i>	Degan 4737	<i>P. grandifolium</i>
Basualdo 1685	<i>P. australe</i> X <i>guineense</i>	Degan 4738	<i>P. grandifolium</i>
Basualdo 1713	<i>P. australe</i> var. <i>australe</i>	Degan 4739	<i>P. grandifolium</i>
Basualdo 1732	<i>P. grandifolium</i>	Degan 4740	<i>P. grandifolium</i>
Basualdo 1734	<i>P. australe</i> var. <i>australe</i>	Degan 4741	<i>P. grandifolium</i>
Basualdo 2074	<i>P. australe</i> var. <i>australe</i>	Degan 4742	<i>P. grandifolium</i>
Basualdo 2076	<i>P. missionum</i>	Degan 4743	<i>P. grandifolium</i>
Basualdo 2267	<i>P. australe</i> var. <i>australe</i>	Degan 4744	<i>P. grandifolium</i>
Basualdo 2315	<i>P. guineense</i>	Degan 4764	<i>P. grandifolium</i>
Basualdo 2316	<i>P. australe</i> var. <i>australe</i>	Del Valle 170	<i>P. guineense</i>
Basualdo 2319	<i>P. guajava</i> X <i>guineense</i>	Dure 112	<i>P. grandifolium</i>
Basualdo 2597	<i>P. guajava</i>	Ekman 2041	<i>P. guineense</i>
Basualdo 2672	<i>P. guajava</i>	Ekman 2045	<i>P. kennedyanum</i>
Basualdo 2673	<i>P. guajava</i>	Ekman 2048	<i>P. salutare</i> var. <i>mucronatum</i>
Basualdo 2675	<i>P. guineense</i>	Ekman 2056	<i>P. salutare</i> var. <i>sericeum</i>
Basualdo 2724	<i>P. australe</i> var. <i>australe</i>	Eliceche 3	<i>P. guajava</i>
Basualdo 3186	<i>P. guajava</i>	Evrard 8285	<i>P. guineense</i>
Basualdo 3303	<i>P. guineense</i>	Fernandez C. 4186	<i>P. guineense</i>
Basualdo 4862	<i>P. australe</i> var. <i>australe</i>	Fernandez C. 7396	<i>P. salutare</i> var. <i>salutare</i>
Beck 2531	<i>P. guineense</i>	Figueredo 6	<i>P. laruotteanum</i>
Beck 2672	<i>P. guineense</i>	Figueroa 11923	<i>P. guajava</i>
Beck 3451	<i>P. guineense</i>	Foster 113	<i>P. acutangulum</i>
Beck 5487	<i>P. acutangulum</i>	Foster 142	<i>P. acutangulum</i>
Beck 5672	<i>P. acutangulum</i>	Foster 162	<i>P. guineense</i>
Beck 10046	<i>P. nutans</i>	Foster 358	<i>P. acutangulum</i>
Beck 15137	<i>P. acidum</i>	Foster 738	<i>P. acutangulum</i>
Beck 31843	<i>P. guineense</i>	Foster 3426	<i>P. kennedyanum</i>
Bernardi 18306	<i>P. australe</i> var. <i>australe</i>	Foster 13368	<i>P. kennedyanum</i>
Bernardi 18348	<i>P. salutare</i> var. <i>salutare</i>	Garvizu &	
Bertoni 1236	<i>P. kennedyanum</i>	Fuentes 359	<i>P. acutangulum</i>
Blanchoud 2243	<i>P. kennedyanum</i>	Gentry 43654	<i>P. acidum</i>
Boelcke 4669	<i>P. cattleianum</i>	Gentry 78002	<i>P. densicomum</i>
Boom 4068	<i>P. guajava</i>	Gomez Sosa 99	<i>P. salutare</i> var. <i>mucronatum</i>
Bordas 4013	<i>P. guineense</i>	Gonzales 92	<i>P. guajava</i>
Bordas 4260	<i>P. guineense</i>	Guillén 4	<i>P. oligospermum</i>

THE GENUS *PSIDIUM* (MYRTACEAE) IN BOLIVIA AND PARAGUAY

Guillén 177	<i>P. oligospermum</i>	Hawkes 4385	<i>P. guineense</i>
Guillén 464	<i>P. striatulum</i>	Heinonen 179	<i>P. kennedyanum</i>
Guillén 509	<i>P. nutans</i>	Heinonen 205	<i>P. grandifolium</i>
Guillén 994	<i>P. striatulum</i>	Heinonen 281	<i>P. kennedyanum</i>
Guillén 1023	<i>P. salutare</i> var. <i>pohlianum</i>	Herter 52	<i>P. salutare</i> var. <i>mucronatum</i>
Guillén 1766	<i>P. acutangulum</i>	Herter 930	<i>P. salutare</i> var. <i>mucronatum</i>
Guillén 1868	<i>P. oligospermum</i>	Herter 8051	<i>P. salutare</i> var. <i>sericeum</i>
Guillén 2142	<i>P. nutans</i>	Herter 8052	<i>P. salutare</i> var. <i>mucronatum</i>
Guillén 2426	<i>P. nutans</i>	Hessler 4830	<i>P. grandifolium</i>
Guillén 2541	<i>P. striatulum</i>	Hieronymus 895	<i>P. salutare</i> var. <i>mucronatum</i>
Guillén 2605	<i>P. guajava</i>	Hilgert 2453	<i>P. guineense</i>
Guillén 2728	<i>P. guineense</i>	Hilgert 2639	<i>P. guineense</i>
Guillén 2945	<i>P. guajava</i>	Honfi 308	<i>P. kennedyanum</i>
Guillén 3372	<i>P. guineense</i>	Huidobro 1920	<i>P. kennedyanum</i>
Guillén 3602	<i>P. oligospermum</i>	Huidobro 2221	<i>P. guajava</i>
Guillén 3811	<i>P. oligospermum</i>	Ibarrola 1434	<i>P. salutare</i> var. <i>sericeum</i>
Guillén 4340	<i>P. oligospermum</i>	Ibarrola 2135	<i>P. salutare</i> var. <i>mucronatum</i>
Guillén 4806	<i>P. laruotteanum</i>	Ibarrola 2143	<i>P. salutare</i> var. <i>sericeum</i>
Haber 1772	<i>P. guineense</i>	Ibarrola 2481	<i>P. salutare</i> var. <i>mucronatum</i>
Hahn 872	<i>P. guineense</i>	Ibarrola 3129	<i>P. kennedyanum</i>
Hahn 1279	<i>P. guajava</i>	Ibarrola 3971	<i>P. salutare</i> var. <i>sericeum</i>
Hahn 1364	<i>P. grandifolium</i>	Ibarrola 4022	<i>P. kennedyanum</i>
Hahn 1772	<i>P. australe</i> var. <i>australe</i>	Itaipu Binac.161	<i>P. australe</i> var. <i>australe</i>
Hahn 2350	<i>P. guineense</i>	Jardim 189	<i>P. striatulum</i>
Hahn 2393	<i>P. guineense</i>	Jardim 342	<i>P. guineense</i>
Hahn 2610	<i>P. guineense</i>	Jardim 2125	<i>P. oligospermum</i>
Hahn 2714	<i>P. guineense</i>	Jardim 3286	<i>P. oligospermum</i>
Hartweg 977	<i>P. salutare</i>	Jardim 3572	<i>P. guineense</i>
Hartweg 980	<i>P. guineense</i>	Jorgensen 2113	<i>P. guajava</i>
Hassler 1330	<i>P. australe</i>	Jorgensen 2114	<i>P. kennedyanum</i>
Hassler 1442	<i>P. guajava</i>	Jorgensen 3261	<i>P. guajava</i>
Hassler 1689	<i>P. guineense/guajava</i>	Jorgensen 3643	<i>P. guajava</i>
Hassler 3393	<i>P. guineense</i>	Jorgensen 3645	<i>P. grandifolium</i>
Hassler 3498	<i>P. salutare</i> var. <i>sericeum</i>	Keller 2569	<i>P. guajava</i>
Hassler 3641	<i>P. guineense</i>	Keller 3554	<i>P. australe</i> var. <i>australe</i>
Hassler 4387	<i>P. laruotteanum</i>	Keller 6078	<i>P. salutare</i> var. <i>mucronatum</i>
Hassler 4400	<i>P. salutare</i> var. <i>salutare</i>	Keller 7576	<i>P. missionum</i>
Hassler 4521	<i>P. grandifolium</i>	Killeen 2359	<i>P. guineense</i>
Hassler 4522	<i>P. nutans</i>	Killeen 3463	<i>P. oligospermum</i>
Hassler 4609	<i>P. salutare</i>	Killeen 5614	<i>P. salutare</i>
Hassler 4648	<i>P. grandifolium?</i>	Killeen 5943	<i>P. salutare</i> var. <i>salutare</i>
Hassler 4662	<i>P. guineense</i>	Killeen 6757	<i>P. nutans</i>
Hassler 4745	<i>P. guajava</i>	Killeen 6947	<i>P. acutangulum</i>
Hassler 4753	<i>P. guajava</i>	Killeen 6947	<i>P. acutangulum</i>
Hassler 4762	<i>P. guineense</i>	Killeen 6974	<i>P. nutans</i>
Hassler 4792	<i>P. guajava</i>	Killeen 7819	<i>P. laruotteanum</i>
Hassler 4830	<i>P. grandifolium</i>	Killeen 7822	<i>P. salutare</i> var. <i>salutare</i>
Hassler 4831	<i>P. grandifolium</i>	Krapovickas 12231	<i>P. salutare</i> var. <i>sericeum</i>
Hassler 4870	<i>P. guineense</i> X <i>grandifolium?</i>	Krapovickas 13352	<i>P. australe</i>
Hassler 4990	<i>P. australe</i>	Krapovickas 13913	<i>P. grandifolium</i>
Hassler 5076	<i>P. australe</i>	Krapovickas 14193	<i>P. guineense</i>
Hassler 5079	<i>P. laruotteanum</i>	Krapovickas 16687	<i>P. salutare</i> var. <i>sericeum</i>
Hassler 5082	<i>P. australe</i>	Krapovickas 16925	<i>P. salutare</i> var. <i>mucronatum</i>
Hassler 5263	<i>P. grandifolium</i>	Krapovickas 17164	<i>P. salutare</i> var. <i>mucronatum</i>
Hassler 5659	<i>P. grandifolium</i>	Krapovickas 18307	<i>P. australe</i> var. <i>australe</i>
Hassler 6384	<i>P. nutans</i>	Krapovickas 20026	<i>P. nutans</i>
Hassler 6554	<i>P. guineense</i>	Krapovickas 20974	<i>P. salutare</i> var. <i>mucronatum</i>
Hassler 6632	<i>P. australe</i>	Krapovickas 21174	<i>P. salutare</i> var. <i>sericeum</i>
Hassler 6633	<i>P. guineense</i>	Krapovickas 21222	<i>P. salutare</i> var. <i>mucronatum</i>
Hassler 6751	<i>P. guineense</i>	Krapovickas 23378	<i>P. australe</i> var. <i>australe</i>
Hassler 6805	<i>P. grandifolium</i>	Krapovickas 25477	<i>P. salutare</i> var. <i>mucronatum</i>
Hassler 6947	<i>P. salutare</i>	Krapovickas 25876	<i>P. salutare</i> var. <i>mucronatum</i>
Hassler 7099	<i>P. grandifolium</i>	Krapovickas 25985	<i>P. salutare</i> var. <i>mucronatum</i>
Hassler 7135	<i>P. nutans</i>	Krapovickas 28713	<i>P. grandifolium</i>
Hassler 7402	<i>P. kennedyanum</i>	Krapovickas 32613	<i>P. grandifolium</i>
Hassler 7793	<i>P. guajava</i>	Krapovickas 41066	<i>P. nutans</i>
Hassler 8231	<i>P. grandifolium</i>	Krapovickas 44151	<i>P. guineense</i>
Hassler 8529	<i>P. grandifolium</i>	Krapovickas 45632	<i>P. kennedyanum</i>
Hassler 9556	<i>P. grandifolium</i>	Krapovickas 45767	<i>P. grandifolium</i>
Hassler 11401	<i>P. suffruticosum</i>	Krapovickas 45779	<i>P. grandifolium</i>

Krapovickas 45798	<i>P. grandifolium</i>	Landrum 5732	<i>P. guineense</i>
Krapovickas 46065	<i>P. grandifolium</i>	Landrum 5733	<i>P. grandifolium</i>
Krapovickas 46176	<i>P. missionum</i>	Landrum 5734	<i>P. guineense</i>
Krapovickas & Cristóbal 13255	<i>P. guineense</i>	Landrum 5735	<i>P. missionum</i>
Krapovickas & Cristóbal 13269	<i>P. australe</i> var. <i>australe</i>	Landrum 5738	<i>P. missionum</i>
Krapovickas & Cristóbal 13609	<i>P. kennedyanum</i>	Landrum 5740	<i>P. missionum</i>
Krapovickas & Cristóbal 15587	<i>P. kennedyanum</i>	Landrum 5741	<i>P. australe</i> var. <i>australe</i>
Krapovickas & Cristóbal 16511	<i>P. guajava</i>	Landrum 5742	<i>P. guajava</i>
Krapovickas & Cristóbal 20861	<i>P. kennedyanum</i>	Landrum 5747	<i>P. guajava</i>
Krapovickas & Cristóbal 20867	<i>P. kennedyanum</i>	Landrum 8553	<i>P. guajava</i>
Krapovickas & Cristóbal 28658	<i>P. australe</i> var. <i>australe</i>	Landrum 8564	<i>P. guajava</i>
Krapovickas & Cristóbal 28785	<i>P. salutare</i> var. <i>mucronatum</i>	Landrum 8608	<i>P. guajava</i>
Krapovickas & Cristóbal 28934	<i>P. salutare</i> var. <i>mucronatum</i>	Landrum 8609	<i>P. guineense</i>
Krapovickas & Cristóbal 44444	<i>P. grandifolium</i>	Landrum 8614	<i>P. guineense</i>
Krapovickas & Cristóbal 44607	<i>P. missionum</i>	Landrum 8618	<i>P. guajava</i>
Krapovickas & Cristóbal 44629	<i>P. guajava</i> X <i>guineense</i>	Landrum 8648	<i>P. guineense</i>
Landrum 3856	<i>P. salutare</i> var. <i>mucronatum</i>	Landrum 8649	<i>P. missionum</i>
Landrum 5676	<i>P. guineense</i>	Landrum 8650	<i>P. guajava</i>
Landrum 5677	<i>P. guajava</i>	Landrum 8652	<i>P. guineense</i>
Landrum 5678	<i>P. guineense</i>	Landrum 8661	<i>P. grandifolium</i>
Landrum 5679	<i>P. guineense</i>	Landrum 8662	<i>P. grandifolium</i>
Landrum 5680	<i>P. guineense</i>	Landrum 8663	<i>P. grandifolium</i>
Landrum 5681	<i>P. guajava</i>	Landrum 8664	<i>P. grandifolium</i>
Landrum 5682	<i>P. guajava</i> X <i>guineense</i>	Landrum 8665	<i>P. salutare</i> var. <i>mucronatum</i>
Landrum 5683	<i>P. guajava</i>	Landrum 8666	<i>P. missionum</i>
Landrum 5684	<i>P. guajava</i>	Landrum 8667	<i>P. grandifolium</i>
Landrum 5685	<i>P. guajava</i>	Landrum 8668	<i>P. guineense</i>
Landrum 5686	<i>P. guajava</i> X <i>guineense</i>	Landrum 8669	<i>P. grandifolium</i>
Landrum 5687	<i>P. guajava</i> X <i>guineense</i>	Landrum 8670	<i>P. australe</i> var. <i>australe</i>
Landrum 5688	<i>P. guineense</i>	Landrum 8671	<i>P. guineense</i>
Landrum 5689	<i>P. guajava</i>	Landrum 8672	<i>P. guineense</i>
Landrum 5690	<i>P. guajava</i>	Landrum 8675	<i>P. guineense</i>
Landrum 5691	<i>P. guajava</i>	Landrum 8692	<i>P. guineense</i>
Landrum 5692	<i>P. guajava</i>	Landrum 8700	<i>P. australe</i> var. <i>australe</i>
Landrum 5693	<i>P. guajava</i> X <i>guineense</i>	Landrum 8711	<i>P. guajava</i>
Landrum 5694	<i>P. guajava</i> X <i>guineense</i>	Landrum 8729	<i>P. grandifolium</i>
Landrum 5695	<i>P. guajava</i> X <i>guineense</i>	Landrum 8730	<i>P. guajava</i>
Landrum 5696	<i>P. guajava</i> X <i>guineense</i>	Landrum 8732	<i>P. grandifolium</i>
Landrum 5697	<i>P. guajava</i>	Landrum 8764	<i>P. salutare</i> var. <i>sericeum</i>
Landrum 5698	<i>P. guajava</i> X <i>guineense</i>	Landrum 8765	<i>P. salutare</i> var. <i>sericeum</i>
Landrum 5699	<i>P. guajava</i>	Landrum 8766	<i>P. grandifolium</i>
Landrum 5700	<i>P. guineense</i>	Landrum 8767	<i>P. grandifolium</i>
Landrum 5701	<i>P. salutare</i> var. <i>sericeum</i>	Landrum 8768	<i>P. grandifolium</i>
Landrum 5702	<i>P. salutare</i> var. <i>sericeum</i>	Landrum 8769	<i>P. missionum</i>
Landrum 5704	<i>P. grandifolium</i>	Landrum 8770	<i>P. guineense</i>
Landrum 5705	<i>P. grandifolium</i>	Landrum 8771	<i>P. guineense</i>
Landrum 5706	<i>P. grandifolium</i>	Landrum 8772	<i>P. guajava</i> X <i>guineense</i>
Landrum 5707	<i>P. grandifolium</i>	Landrum 8773	<i>P. guineense</i>
Landrum 5708	<i>P. guineense</i>	Landrum 8774	<i>P. guajava</i>
Landrum 5709	<i>P. grandifolium</i>	Landrum 8776	<i>P. grandifolium</i> X <i>guineense</i>
Landrum 5717	<i>P. grandifolium</i>	Landrum 8777	<i>P. guineense</i>
Landrum 5718	<i>P. missionum</i>	Landrum 8779	<i>P. guineense</i>
Landrum 5723	<i>P. guineense</i>	Landrum 8780	<i>P. guineense</i>
Landrum 5726	<i>P. guajava</i>	Landrum 8784	<i>P. grandifolium</i>
Landrum 5727	<i>P. guineense</i>	Landrum 8785	<i>P. guajava</i> X <i>guineense</i>
Landrum 5730	<i>P. missionum</i>	Landrum 8787	<i>P. guajava</i>
Landrum 5731	<i>P. grandifolium</i>	Landrum 8788	<i>P. guajava</i> X <i>guineense</i>
		Landrum 8789	<i>P. australe</i> var. <i>australe</i>
		Landrum 8790	<i>P. salutare</i> var. <i>sericeum</i>
		Landrum 8791	<i>P. australe</i> var. <i>australe</i>
		Landrum 8792	<i>P. grandifolium</i>
		Landrum 8794	<i>P. grandifolium</i>
		Landrum 8795	<i>P. australe</i> var. <i>australe</i>
		Landrum 8796	<i>P. salutare</i> var. <i>mucronatum</i>
		Landrum 8797	<i>P. missionum</i>
		Landrum 8798	<i>P. australe</i> var. <i>australe</i>
		Landrum 8799	<i>P. missionum</i>
		Landrum 8800	<i>P. grandifolium</i>
		Landrum 8801	<i>P. grandifolium</i>
		Landrum 8802	<i>P. guineense</i>

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Landrum 8803	<i>P. grandifolium</i>	Martinez C. 8669	<i>P. missionum</i>
Landrum 8804	<i>P. guineense</i>	Martinez C. 8864	<i>P. australe</i> var. <i>australe</i>
Landrum 8805	<i>P. missionum</i>	Martinez C. 9449	<i>P. grandifolium</i>
Landrum 8806	<i>P. grandifolium</i>	Martinez C. 9888	<i>P. australe</i> var. <i>australe</i>
Landrum 8807	<i>P. guineense</i>	Martinez C. 11080	<i>P. salutare</i> var. <i>mucronatum</i>
Landrum 8808	<i>P. missionum</i>	Mereles 1379	<i>P. kennedyanum</i>
Landrum 8810	<i>P. grandifolium</i>	Mereles 1689	<i>P. guajava</i>
Landrum 8811	<i>P. grandifolium</i> X <i>guineense</i>	Mereles 2174	<i>P. australe</i> var. <i>australe</i>
Landrum 8812	<i>P. missionum</i>	Mereles 3451	<i>P. guajava</i>
Landrum 8813	<i>P. guineense</i>	Mereles 4218	<i>P. guineense</i>
Landrum 8814	<i>P. salutare</i> var. <i>mucronatum</i>	Mereles 7874	<i>P. guineense</i>
Landrum 8816	<i>P. australe</i> var. <i>australe</i>	Mexia 4266	<i>P. guineense</i>
Landrum 8817	<i>P. grandifolium</i>	Meyer 8599	<i>P. kennedyanum</i>
Landrum 8818	<i>P. guineense</i>	Meyer 11007	<i>P. salutare</i> var. <i>sericeum</i>
Landrum 8819	<i>P. missionum</i>	Meyer 11513	<i>P. grandifolium</i>
Landrum 8820	<i>P. australe</i> X <i>guineense</i>	Meyer 21738	<i>P. guineense</i>
Landrum 8821	<i>P. missionum</i>	Meyer 23541	<i>P. guajava</i>
Landrum 8823	<i>P. grandifolium</i>	Molas 677	<i>P. salutare</i> var. <i>mucronatum</i>
Landrum 8824	<i>P. missionum</i>	Molas 899	<i>P. guineense</i>
Landrum 8825	<i>P. australe</i> var. <i>australe</i>	Montes 851	<i>P. australe</i> var. <i>australe</i>
Landrum 8826	<i>P. guineense</i>	Montes 1260	<i>P. missionum</i>
Landrum 8827	<i>P. guajava</i> X <i>guineense</i>	Montes 1554	<i>P. missionum</i>
Landrum 8828	<i>P. missionum</i>	Montes 9520	<i>P. guineense</i>
Landrum 8830	<i>P. grandifolium</i>	Montes 10997	<i>P. grandifolium</i>
Landrum 8831	<i>P. guineense</i>	Montes 14743	<i>P. grandifolium</i>
Landrum 8832	<i>P. grandifolium</i>	Montes 14781	<i>P. missionum</i>
Landrum 8833	<i>P. guajava</i>	Montes 14782	<i>P. australe</i> var. <i>australe</i>
Landrum 8834	<i>P. guajava</i> X <i>guineense</i>	Montes 14785	<i>P. guineense</i>
Landrum 8835	<i>P. grandifolium</i>	Montes 14789	<i>P. guineense</i>
Landrum 8836	<i>P. grandifolium</i>	Montes 14794	<i>P. grandifolium</i>
Landrum 8838	<i>P. missionum</i>	Montes 14806	<i>P. missionum</i>
Landrum 8839	<i>P. guineense</i>	Montes 16212	<i>P. missionum</i>
Landrum 8841	<i>P. nutans</i>	Montes 27604	<i>P. guineense</i>
Landrum 8842	<i>P. guineense</i>	Morong 118	<i>P. guajava</i>
Landrum 8843	<i>P. guajava</i>	Morong 890	<i>P. kennedyanum</i>
Landrum 8844	<i>P. guajava</i> X <i>guineense</i>	Mostacedo &	
Landrum 8853	<i>P. grandifolium</i>	Menacho 1207	<i>P. salutare</i> var. <i>salutare</i>
Landrum 8855	<i>P. grandifolium</i>	Munoz 1783	<i>P. salutare</i> var. <i>sericeum</i>
Landrum 8856	<i>P. grandifolium</i>	Nee 31784	<i>P. acutangulum</i>
Landrum 8857	<i>P. suffruticosum</i>	Nee 33462	<i>P. guajava</i>
Landrum 8858	<i>P. grandifolium</i>	Nee 33760	<i>P. guineense</i>
Landrum 8859	<i>P. australe</i> var. <i>australe</i>	Nee 39638	<i>P. guajava</i>
Landrum 8860	<i>P. laruotteanum</i>	Nee 39697	<i>P. guineense</i>
Landrum 8862	<i>P. grandifolium</i> X <i>guineense</i>	Nee 40273	<i>P. guineense</i>
Landrum 8863	<i>P. grandifolium</i> X <i>guineense</i>	Nee 40733	<i>P. guineense</i>
Landrum 8865	<i>P. grandifolium</i>	Nee 42094	<i>P. guineense</i>
Landrum 8866	<i>P. guineense</i>	Nee 43465	<i>P. salutare</i> var. <i>sericeum</i>
Landrum 8867	<i>P. guajava</i>	Nee 46389	<i>P. guajava</i>
Landrum 8868	<i>P. australe</i> var. <i>australe</i>	Nee & Coibra 35829	<i>P. guajava</i>
Landrum 8869	<i>P. grandifolium</i>	Nee &	
Landrum 8873	<i>P. grandifolium</i> X <i>guineense</i>	Coimbra 35836	<i>P. guineense</i>
Landrum 8877	<i>P. guajava</i>	Nee & Vargas 37455	<i>P. guineense</i>
Landrum 8879	<i>P. kennedyanum</i>	Nee & Vargas 43465	<i>P. salutare</i> var. <i>sericeum</i>
Legname &		Neiff 1405	<i>P. kennedyanum</i>
Cuezzo 8752	<i>P. guajava</i>	Neiff 1560	<i>P. kennedyanum</i>
Legrand 1064	<i>P. salutare</i> var. <i>mucronatum</i>	Neiff 1577	<i>P. kennedyanum</i>
Legrand 2710	<i>P. salutare</i> var. <i>mucronatum</i>	Neiff 1670	<i>P. kennedyanum</i>
Legrand 2711	<i>P. salutare</i> var. <i>sericeum</i>	Nicora 5198	<i>P. salutare</i> var. <i>mucronatum</i>
Legrand 3338	<i>P. salutare</i> var. <i>mucronatum</i>	Novara 5111	<i>P. guineense</i>
Legrand 4145	<i>P. salutare</i> var. <i>sericeum</i>	Novara 7074	<i>P. guineense</i>
Lillo 1351	<i>P. salutare</i> var. <i>mucronatum</i>	Novara 12125	<i>P. guajava</i>
Lorents 87	<i>P. kennedyanum</i>	Ortiz 847	<i>P. australe</i> var. <i>australe</i>
Lourteig 2736	<i>P. salutare</i> var. <i>mucronatum</i>	Ortiz 918	<i>P. grandifolium</i>
Lourteig 2737	<i>P. salutare</i> var. <i>sericeum</i>	Ortiz 929	<i>P. guineense</i>
Loza 475	<i>P. oligospermum</i>	Ortiz 1236	<i>P. guajava</i>
Mandon 633	<i>P. guineense</i>	Ortiz 1274	<i>P. guineense</i>
Martinez C. 8	<i>P. salutare</i> var. <i>sericeum</i>	Ortiz S. 81	<i>P. oligospermum</i>
Martinez C. 22	<i>P. missionum</i>	Ortiz S. 212	<i>P. oligospermum</i>
Martinez C. 34	<i>P. missionum</i>	Osten 16563	<i>P. salutare</i> var. <i>sericeum</i>
Martinez C. 4739	<i>P. salutare</i> var. <i>mucronatum</i>	Osten 16651	<i>P. salutare</i> var. <i>sericeum</i>

Palaci 475	P. guineense	Schinini 11476	P. kennedyanum
Panfil 1371	P. striatulum	Schinini 13068	P. salutare var. sericeum
Panfil 1374	P. salutare var. pohlianum	Schinini 13846	P. kennedyanum
Paul 16	P. guajava	Schinini 14105	P. salutare var. mucronatum
Pedersen 935	P. guajava	Schinini 14127	P. salutare var. sericeum
Pedersen 4366	P. grandifolium	Schinini 15894	P. salutare var. sericeum
Pedersen 4439	P. kennedyanum	Schinini 16021	P. kennedyanum
Pedersen 4449	P. nutans	Schinini 16188	P. salutare var. sericeum
Pedersen 15587	P. salutare var. mucronatum	Schinini 16225	P. salutare var. mucronatum
Pedersen 16180	P. guajava	Schinini 17110	P. salutare var. sericeum
Pena-Chocarro 2366	P. nutans	Schinini 17192	P. salutare var. mucronatum
Pena-Chocarro 2366	P. nutans	Schinini 17373	P. salutare var. sericeum
Perez 380	P. salutare var. mucronatum	Schinini 20027	P. kennedyanum
Perez 1465	P. grandifolium	Schinini 21735	P. kennedyanum
Perez 1480	P. guajava	Schinini 21893	P. grandifolium
Perez 1518	P. guineense	Schinini 21915	P. missionum
Pin 587	P. guineense	Schinini 21915	P. missionum
Pittier 2920	P. guajava	Schinini 22902	P. salutare var. salutare
Praderi 740	P. salutare var. sericeum	Schinini 23646	P. salutare var. mucronatum
Prance 6063	P. acutangulum	Schinini 26053	P. grandifolium
Prance 6064	P. densicomum	Schinini 26054	P. australe var. australe
Prance 6204	P. friedrichsthalianum	Schinini 26106	P. guineense
Quarin 2069	P. salutare var. mucronatum	Schinini 26108	P. salutare var. sericeum
Quarin 2830	P. guineense	Schinini 27706	P. kennedyanum
Quevedo 804	P. oligospermum	Schinini 27820	P. australe var. australe
Quevedo 2382	P. acutangulum	Schinini 30328	P. guajava
Quevedo 2389	P. striatulum	Schinini 31690	P. guajava
Quevedo 2533	P. striatulum	Schinini 35655	P. guineense
Quevedo 2644	P. acutangulum	Schmeda 792	P. guineense
Renvoize 3225	P. guajava	Schmeda 801	P. nutans?
Renvoize 3634	P. guineense	Schmeda 803	P. guajava
Renvoize 3655	P. guajava	Schmeda 817	P. guajava
Rodriguez 13	P. oligospermum	Schmeda 824	P. guineense
Rodriguez 16	P. missionum	Schultz 7690	P. guineense
Rodriguez 239	P. grandifolium	Schulz 6848	P. kennedyanum
Rodriguez &		Schulz 6889	P. salutare var. mucronatum
Surubi 506	P. laruotteanum	Schulz 9826	P. kennedyanum
Rodriguez &		Schulz 10231	P. kennedyanum
Surubi 549	P. salutare var. salutare	Schulz 12110	P. kennedyanum
Rodriguez &		Schulz 16291	P. kennedyanum
Surubi 592	P. salutare var. pohlianum	Schulz 18601	P. salutare var. mucronatum
Rodriguez &		Schwarz 402	P. kennedyanum
Surubi 630	P. salutare var. pohlianum	Schwarz 621	P. guineense
Rojas 12664	P. nutans	Schwarz 10969	P. salutare var. sericeum
Rolon 160	P. grandifolium	Serrano 6900	P. guineense
Rosengurtt 2344	P. salutare var. mucronatum	Sesmero 100870	P. guineense
Rosengurtt 3250	P. salutare var. sericeum	Seta 447	P. guineense
Rosengurtt 4183	P. salutare var. mucronatum	Silveira 1063	P. acidum
Rosengurtt 5407	P. grandifolium	Simonis 173	P. guajava
Rumiz 36	P. kennedyanum	Solis N. 242	P. salutare var. mucronatum
Rumiz 173	P. kennedyanum	Solomon 7040	P. guineense
Rumiz 220	P. kennedyanum	Solomon 8504	P. guineense
Rusby 2083	P. guajava	Solomon 8871	P. guineense
Rusby 2460	P. guineense	Solomon 18044	P. guineense
Saldias 323	P. guajava	Solomon &	
Saldias 2526	P. oligospermum	Kuijt 11616	P. guineense
Saldias 3596	P. oligospermum	Solomon &	
Saldias 3744	P. oligospermum	Nee 14305	P. guineense
Salinas 2924	P. guineense	Soria 2518	P. guineense
Salomon 14564	P. guineense	Soria 2536	P. australe var. australe
Sanchez 305	P. salutare var. salutare	Soria 2544	P. australe var. australe
Saravia 11705	P. grandifolium	Soria 3034	P. grandifolium
Schiede 512	P. guineense	Soria 3036	P. guineense
Schiede 541	P. guineense	Soria 3066	P. grandifolium
Schinini 2126	P. nutans	Soria 3383	P. australe var. australe
Schinini 4392	P. grandifolium	Soria 3836	P. guineense
Schinini 8462	P. salutare var. mucronatum	Soria 4929	P. grandifolium
Schinini 8831	P. grandifolium	Soria 5410	P. australe var. australe
Schinini 10678	P. salutare var. mucronatum	Soria 7867	P. grandifolium
Schinini 11099	P. guineense	Soto 424	P. suffruticosum

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Sparre & Vervoorst 2272	<i>P. grandifolium</i>	Zardini 9460	<i>P. guajava</i>
Sparre & Vervoorst 814	<i>P. salutare</i> var. <i>sericeum</i>	Zardini 10168	<i>P. guajava</i>
Steinbach 389	<i>P. guajava</i>	Zardini 10227	<i>P. guineense</i>
Steinbach 6652	<i>P. guajava</i>	Zardini 10249	<i>P. guineense</i>
Steinbach 6653	<i>P. guineense</i>	Zardini 10534	<i>P. guineense</i>
Steinbach 6675	<i>P. oligospermum</i>	Zardini 10715	<i>P. guajava</i>
Stutz 1897	<i>P. guineense</i>	Zardini 10721	<i>P. guajava</i>
Teran 4206	<i>P. guajava</i>	Zardini 10780	<i>P. guajava</i>
Torres 2	<i>P. guineense</i>	Zardini 10785	<i>P. guineense</i>
Torres 3	<i>P. guineense</i>	Zardini 11662	<i>P. guineense</i>
Torres 4	<i>P. guajava</i>	Zardini 11672	<i>P. guineense</i>
Torres 6	<i>P. laruotteanum</i>	Zardini 12548	<i>P. guineense</i>
Tressens 1491	<i>P. salutare</i> var. <i>mucronatum</i>	Zardini 12593	<i>P. guineense</i>
Tressens 2420	<i>P. salutare</i> var. <i>sericeum</i>	Zardini 14951	<i>P. guineense</i>
Tressens 2651	<i>P. salutare</i> var. <i>mucronatum</i>	Zardini 15347	<i>P. guineense</i>
Tressens 2878	<i>P. salutare</i> var. <i>mucronatum</i>	Zardini 15360	<i>P. guineense</i>
Tressens 3470	<i>P. guineense</i>	Zardini 15408	<i>P. guajava</i>
Tressens 5014	<i>P. guineense</i>	Zardini 15437	<i>P. guineense</i>
Tressens 6640	<i>P. salutare</i> var. <i>mucronatum</i>	Zardini 15452	<i>P. salutare</i> var. <i>mucronatum</i>
Troll 143	<i>P. guineense</i>	Zardini 15653	<i>P. guajava</i>
Turpe 4774	<i>P. guineense</i>	Zardini 15857	<i>P. guajava</i>
Vanni 4	<i>P. guajava</i>	Zardini 15871	<i>P. guineense</i>
Vanni 68	<i>P. kennedyanum</i>	Zardini 16254	<i>P. guajava</i>
Vanni 973	<i>P. australe</i> var. <i>australe</i>	Zardini 16557	<i>P. guajava</i>
Vanni 1067	<i>P. guineense</i>	Zardini 16568	<i>P. guineense</i>
Vanni 1571	<i>P. guajava</i> X <i>guineense</i>	Zardini 16734	<i>P. guajava</i>
Vanni 3815	<i>P. guajava</i>	Zardini 17281	<i>P. guineense</i>
Vargas 2703	<i>P. acutangulum</i>	Zardini 17336	<i>P. kennedyanum</i>
Vargas 3426	<i>P. acutangulum</i>	Zardini 17425	<i>P. guajava</i>
Vargas 3496	<i>P. grandifolium</i>	Zardini 17878	<i>P. guajava</i>
Vattuone & Bianchi 141	<i>P. grandifolium</i>	Zardini 18503	<i>P. guajava</i>
Velásquez 15871	<i>P. guineense</i>	Zardini 19797	<i>P. kennedyanum</i>
Venturi 1362	<i>P. salutare</i> var. <i>mucronatum</i>	Zardini 19804	<i>P. kennedyanum</i>
Venturi 5197	<i>P. oligospermum</i>	Zardini 20132	<i>P. guajava</i>
Venturi 7582	<i>P. salutare</i> var. <i>sericeum</i>	Zardini 21076	<i>P. guajava</i>
Venturi 9862	<i>P. salutare</i> var. <i>mucronatum</i>	Zardini 21157	<i>P. guineense</i>
Vera 3432	<i>P. australe</i>	Zardini 21421	<i>P. guajava</i>
Werdermann 2677	<i>P. guineense</i>	Zardini 21849	<i>P. kennedyanum</i>
White 264	<i>P. guineense</i>	Zardini 21971	<i>P. grandifolium</i>
Williams 238	<i>P. nutans</i>	Zardini 22329	<i>P. guajava</i>
Wood 17551	<i>P. myrsinites</i>	Zardini 22389	<i>P. kennedyanum</i>
Wood 23462	<i>P. laruotteanum</i>	Zardini 22767	<i>P. guajava</i>
Wood 23727	<i>P. grandifolium</i>	Zardini 22991	<i>P. kennedyanum</i>
Wood 23889	<i>P. laruotteanum</i>	Zardini 23214	<i>P. guajava</i>
Wood 25359	<i>P. suffruticosum</i>	Zardini 23498	<i>P. kennedyanum</i>
Zardini 3504	<i>P. nutans?</i>	Zardini 24372	<i>P. kennedyanum</i>
Zardini 3611	<i>P. guajava</i>	Zardini 24379	<i>P. kennedyanum</i>
Zardini 4079	<i>P. guineense</i>	Zardini 25759	<i>P. kennedyanum</i>
Zardini 4241	<i>P. guajava</i>	Zardini 25882	<i>P. grandifolium</i>
Zardini 4967	<i>P. guajava</i>	Zardini 25892	<i>P. grandifolium</i>
Zardini 5784	<i>P. guajava</i>	Zardini 26407	<i>P. australe</i> var. <i>australe</i>
Zardini 6281	<i>P. guajava</i>	Zardini 27492	<i>P. kennedyanum</i>
Zardini 6695	<i>P. guajava</i>	Zardini 27725	<i>P. guineense</i>
Zardini 6817	<i>P. guajava</i>	Zardini 28735	<i>P. guineense</i>
Zardini 7230	<i>P. guineense</i>	Zardini 29061	<i>P. guineense</i>
Zardini 7247	<i>P. salutare</i> var. <i>mucronatum</i>	Zardini 29081	<i>P. guineense</i>
Zardini 7495	<i>P. guajava</i>	Zardini 29111	<i>P. salutare</i> var. <i>mucronatum</i>
Zardini 7805	<i>P. australe</i> var. <i>australe</i>	Zardini 34974	<i>P. grandifolium</i>
Zardini 7951	<i>P. guajava</i>	Zardini 35346	<i>P. guajava</i>
Zardini 8354	<i>P. guajava</i>	Zardini 35371	<i>P. guajava</i>
Zardini 8784	<i>P. guineense</i>	Zardini 36818	<i>P. guajava</i>
Zardini 8812	<i>P. guajava</i>	Zardini 37378	<i>P. australe</i> var. <i>argenteum</i>
Zardini 8980	<i>P. australe</i> var. <i>australe</i>	Zardini 37474	<i>P. guajava</i>
Zardini 9015	<i>P. salutare</i> var. <i>mucronatum</i>	Zardini 37596	<i>P. missionum</i>
Zardini 9020	<i>P. guineense</i>	Zardini 37601	<i>P. guajava</i>
Zardini 9027	<i>P. australe</i> var. <i>australe</i>	Zardini 37763	<i>P. missionum</i>
Zardini 9333	<i>P. guajava</i>	Zardini 38251	<i>P. kennedyanum</i>
		Zardini 38496	<i>P. nutans</i>
		Zardini 38840	<i>P. guajava</i>
		Zardini 39026	<i>P. australe</i>

Zardini 39917	<i>P. guineense</i>	Zardini 51392	<i>P. laruotheanum</i>
Zardini 40153	<i>P. guajava</i>	Zardini 51395	<i>P. grandifolium</i>
Zardini 41001	<i>P. guajava</i>	Zardini 52092	<i>P. guajava</i> X <i>guineense</i>
Zardini 41069	<i>P. guajava</i>	Zardini 52192	<i>P. grandifolium</i>
Zardini 41464	<i>P. guajava</i>	Zardini 52777	<i>P. australe</i> var. <i>australe</i>
Zardini 41709	<i>P. kennedyanum</i>	Zardini 52826	<i>P. australe</i> var. <i>australe</i>
Zardini 45687	<i>P. salutare</i> var. <i>salutare</i>	Zardini 52836	<i>P. australe</i> var. <i>australe</i>
Zardini 46493	<i>P. grandifolium</i>	Zardini 53074	<i>P. guineense</i>
Zardini 47569	<i>P. guineense</i>	Zardini 53172	<i>P. guineense</i>
Zardini 47580	<i>P. guineense</i>	Zardini 53218	<i>P. guineense</i>
Zardini 47765	<i>P. nutans</i>	Zardini 53812	<i>P. grandifolium</i>
Zardini 47997	<i>P. laruotheanum</i>	Zardini 53882	<i>P. grandifolium</i>
Zardini 48007	<i>P. grandifolium</i>	Zardini 53956	<i>P. grandifolium</i>
Zardini 49116	<i>P. australe</i> var. <i>australe</i>	Zardini 54307	<i>P. guajava</i>
Zardini 49442	<i>P. grandifolium</i>	Zardini 55373	<i>P. missionum</i>
Zardini 49521	<i>P. suffruticosum</i>	Zardini 55694	<i>P. guineense</i>
Zardini 50729	<i>P. grandifolium</i>	Zardini 59825	<i>P. guineense</i>
Zardini 51202	<i>P. suffruticosum</i>		